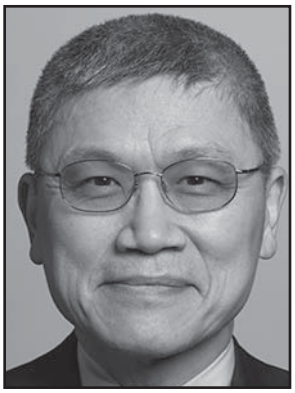
Message from the Vice Presidents

Welcome to Coronado and our Triological Combined Sections Meeting. It has been a pleasure to serve the membership as the Section Vice Presidents and we are very proud of the outstanding program that has been assembled by our Program Chair, Dr. Paul Willging, and our Program Committee members. The Schedule at a Glance will give you an idea of the wide range of presentations and activities available to attendees. Concurrent sessions will maximize our attendees' educational experience. Be sure to join us for our Vice President's Welcome Reception on Thursday evening, a fun networking and social event, and our poster reception and party in the desert on Saturday evening. We would appreciate it if you would visit with the exhibitors who help support our meeting. Refreshments and lunch will be available in the exhibit hall throughout the meeting. Many activities are available on Friday afternoon at the conclusion of the morning's concurrent sessions, including our Triological Society Thesis Seminar for candidates, the annual golf outing, and our ever popular Resident Bowl, which is approved for CME credit. Attendees may also register for the American Society of Geriatric Otolaryngology's scientific session to be held on Friday afternoon.

For those of you who are not Triological Society members or Fellows, we welcome the opportunity to answer your questions regarding how you can become part of this noble organization. The Society awards nearly $500,000 per year in support of research efforts of otolaryngologist-head and neck surgeons, disseminates the latest basic science and clinical information in The Laryngoscope, and our Open Access journal, Laryngoscope Investigative Otolaryngology as well as sharing important and timely otolaryngology updates in ENTtoday. The Society continues to support resident, medical student and Fellow presenters through institutional travel awards. $175,000 was awarded in 2018.

We hope you enjoy all the educational and social aspects of our meeting. Thank you for attending.



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THURSDAY AT A GLANCE

7:30 Breakfast with Exhibitors

Morning Session - Crown Room

8:00 - 9:10	Welcome and Introduction of Special Guests
9:10	Presidential Address
9:30 - 10:00	Break with Exhibitors/View Posters
10:05 - 11:00	Triological Society Best Practices (TRIO BP) Session
11:05 - 11:55	How I Do It Video Session
12:00 - 1:00	Lunch/Visit Exhibits/View Posters

THURSDAY AT A GLANCE CONT'D

Concurrent Sessions 1A & 2A - Crown Room

1:10 - 3:05 Head & Neck Papers and Panel
PANEL - Thyroid Cancer - Where Are We Now?

3:05 - 3:30 Break with Exhibitors/View Posters

3:30 - 5:15 Rhinology/Allergy Papers and Panel
PANEL - Is Sinus Surgery Going Away?

5:15 Adjourn

Concurrent Sessions 1B & 2B - Carousel Room

1:10 - 3:05 Otology/Neurotology Papers and Panel
PANEL - Controversies in Otology/Neurotology

3:05 - 3:30 Break with Exhibitors/View Posters

3:30 - 5:15 Laryngology/Bronchoesophagology Papers and Panel
PANEL - Reflux, Irritable Larynx, and Cough

5:15 Adjourn

5:30 - 7:00 Vice President's Welcome Reception - Sun Deck

FRIDAY AT A GLANCE

7:30 Breakfast with Exhibitors

Triological Business Meetings (Fellows Only)

7:00 - 7:50 Southern Section - Continental

7:00 - 7:50 Western Section - Windsor

Concurrent Sessions 3A & 4A - Crown Room

8:05 - 10:05 Facial Plastic/Reconstructive Surgery Papers and Panel
PANEL - Innovation and Trends in Aesthetic Rhinoplasty

10:05 - 10:30 Break with Exhibitors/View Posters

10:30 - 12:30 General and Rhinology/Allergy/Sinus
PANEL - Topicals in the Management of CRS

FRIDAY AT A GLANCE CONT'D

Concurrent Sessions 3B & 4B - Carousel Room

8:05 - 10:05 General/Sleep Medicine Papers and Panel
PANEL - Complex Sleep Procedures in Children

10:05 - 10:30 Break with Exhibitors/View Posters

10:30 - 12:30 Laryngology/Bronchoesophagology and Pediatric Otolaryngology Papers and Panel
PANEL - Common Errors in DX of Voice Disorders in Adults and Children

12:30 Adjourn

Afternoon Activities (registration or invitation required)

12:30 Golf Outing

12:45 - 1:30 Triological Thesis Seminar - Carousel Room

12:45 - 2:00 Resident Bowl - Crown Room

12:45 - 2:45 Physician/Scientist Meeting - Windsor

2:00 - 6:00 ASGO Scientific Session - Carousel Room

SATURDAY AT A GLANCE

7:30 Breakfast with Exhibitors

Triological Business Meetings (Fellows Only)

7:00 - 7:50 Eastern Section - Continental

7:00 - 7:50 Middle Section - Windsor

General Session - Crown Room

8:05 - 9:25 Another Look at Physician Wellness: Put Your Own Oxygen Mask on Before Helping Others

9:30 - 10:00 Break with Exhibitors/View Posters

Concurrent Sessions 5A & 6A - Crown Room

10:00 - 12:00 General and Head & Neck Papers and Panel
PANEL - Treatment Strategies for Malignancies of Head and Neck

12:00 - 1:00 Lunch/Visit Exhibits/View Posters

SATURDAY AT A GLANCE CONT'D

1:10 - 3:05 Pediatric Otolaryngology Papers and Panel
PANEL - Collaborative Panel with American Society of Pediatric Otolaryngology: Pediatric Multidisciplinary Teams

3:10 - 3:30 Break/View Posters

Concurrent Sessions 5B & 6B - Carousel Room

10:00 - 12:00 Otology/Neurotology Papers and Panel
PANEL - Meniere's Disease: Pearls in Patient Management

12:00 - 1:00 Lunch/Visit Exhibits/View Posters

1:10 - 3:10 General and Sleep Medicine Papers and Panel
PANEL - Challenges to Professionalism in Our Healthcare System 2019

3:10 - 3:30 Break/View Posters

General Session - Crown Room

3:30 - 4:40 General Panels
PANEL - Military Medical Panel: Department of Defense Research and Innovation from the Battlefield to the Bedside

4:45 Adjourn

Evening Activities

5:00 Meet the Authors Poster Reception - Ballroom

6:15 Wrap Up Party - Ballroom

Food, Beverages and Fun

About the Triological Society
The American Laryngological, Rhinological and Otological Society, Inc., aka The Triological Society, was founded in 1895 in New York, NY. Since its founding, the Triological Society has attracted the best and brightest in academic and clinical otolaryngology. Membership in the Triological Society brings the distinction of being elected to the most prestigious society in otolaryngology. Active Fellowship is achieved by presenting a thesis in the field of otolaryngology considered acceptable to a panel of peers. For those entering the field of otolaryngology, the Society provides role models. For those who are committed to research and related scholarly activity, the Society offers fellowship with like-minded peers who share common values, interests, and concerns.

The Society disseminates scientific information by presenting the latest basic science and clinical information at scientific meetings and through publication of its scientific journals, The Laryngoscope and Laryngoscope Investigative Otolaryngology. The Society promotes research into the causes of and treatments for otolaryngic diseases by attracting promising physicians to scholarly otolaryngology research and supporting their development, providing financial support for the research efforts of young scientists, and promoting the highest standards in the field of otolaryngology-head and neck surgery.

Mission Statement
The mission of the Triological Society is to assist physicians and other health care professionals in maintaining and enhancing their knowledge of and skills in otolaryngology-head and neck surgery in pursuit of improved patient care.

Learning Objectives for This Activity
This activity is designed for otolaryngologists-head and neck surgeons and other health professionals. Upon completion of this course, participants will be able to:

- Recognize the importance of patient selection in the application of care algorithms to their treatment.
- Apply the knowledge of topical medications and irrigations to patients with chronic rhinosinusitis to avoid unnecessary surgical intervention and maximize the long term results of surgical procedures that are performed.
- The military has been an important source of medical innovation. Lessons learned on the battlefield can be directly translated to clinical scenarios in the civilian world. The participant will be able to identify clinical algorithms developed from research conducted by the Department of Defense that are applicable to their practice, and incorporate this new information into the treatment of their patients.
- Multidisciplinary care teams have been shown to provide improved coordination of care and better clinical outcomes for patients with complex conditions. The creation of these teams is difficult. The participants will be able to evaluate the environment where they practice and be able to create a pathway that will allow the successful creation of multidisciplinary care teams.

Exhibits
Exhibitors will include representatives of pharmaceutical companies, instrument companies, diagnostic equipment companies, publishers, and others. We encourage attendees to visit the exhibit hall for information that may assist in their pursuit of improved patient care. Exhibitor arrangements are in compliance with the Accreditation Council for Continuing Medical Education (ACCME) Standards for Commercial Support.

Information presented by exhibitors and oral and poster presenters does not represent an endorsement by the Triological Society.

Disclosure Information
In compliance with the ACCME Accreditation Criteria, the American College of Surgeons, as the accredited provider of this activity, must ensure that anyone in a position to control the content of the educational activity has disclosed all relevant financial relationships with any commercial interest. All reported conflicts are managed by a designated official to ensure a bias-free presentation. Please see the insert to this program for the complete disclosure list.

Program Evaluation and CME Certificates

Participant comments on program evaluation forms assist Program Advisory Committees in determining the direction of future educational activities. We appreciate your input and request that you complete a program evaluation in exchange for a CME certificate of attendance. Records are maintained in the Administrative Office of the Society and maintained by the American College of Surgeons for Fellows of the College. Requests may be made by sending a self-addressed envelope to: Triological Society ● 13930 Gold Circle, Suite 103 ● Omaha, NE 68144 ● 531-355-8900.

CONTINUING MEDICAL EDUCATION CREDIT INFORMATION

Accreditation

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American College of Surgeons and The Triological Society. The American College of Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

AMA PRA Category 1 Credits™

The American College of Surgeons designates this live activity for a maximum of **18** *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

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Guests of Honor

Eastern Section	Eric M. Genden, MD
Middle Section	David Adelstein, MD
Southern Section	Harold C. Pillsbury, MD
Western Section	Richard E. Davis MD

Citation Awardees

Eastern Section
- Ellen M. Friedman, MD FACS
- Robert M. Kellman, MD FACS
- Kenneth W. Altman, MD PhD FACS

Middle Section
- Rod Rezaee, MD
- Michael S. Benninger, MD FACS
- Dennis H. Kraus, MD FACS

Southern Section
- Byron J. Bailey, MD
- Marvin P. Fried, MD FACS
- David W. Kennedy, MD FACS

Western Section
- Roger L. Crumley, MD MBA FACS
- Victor Passy, MD
- William B. Armstrong, MD FACS

Middle Section George Adams Young Faculty Awardee
- Jose P. Zevallos, MD MPH FACS

7th Annual Patrick E. Brookhouser MD Award of Excellence

Stanley M. Shapshay, MD FACS, Albany, NY

Guests of Honor

Honored by Eastern Section - Eric M. Genden, MD FACS

Eric M. Genden, MD MHA, is the Isidore Friesner Endowed Professor and Chairman of Otolaryngology-Head and Neck Surgery and the Senior Associate Dean for Clinical Affairs at the Icahn School of Medicine at Mount Sinai. Dr. Genden is a Professor of Neurosurgery and Immunology and the Director of the Head and Neck Institute at the Mount Sinai Health System. Dr. Genden graduated with high honors from Columbia University and then matriculated to the Icahn School of Medicine at Mount Sinai where he graduated first in his class with a distinction in Research and Investigation. He completed his residency training in Otolaryngology-Head and Neck Surgery at Washington University, Barnes Hospital and then completed a fellowship in head and neck oncology and microvascular surgery at the Mount Sinai Medical Center. Dr. Genden has a Masters in Healthcare Administration from Harvard University.

Dr. Genden's clinical practice is focused on the management of head, neck, and thyroid disease and reconstruction of the head and neck. Dr. Genden's research is dedicated to transplantation immune biology of the trachea and larynx. Previously funded by the National Institute of Health, Dr. Genden has opened the first human tracheal transplantation clinical trial. He has published over two hundred manuscripts and chapters and is the author and editor of six text books. Dr. Genden lives in Westchester County, New York with his wife, Audrey and three children, Eric Jr. (14), Sophia (13), and Isabelle (9).

Honored by Middle Section - David Adelstein, MD

David Adelstein completed his undergraduate education at the University of Chicago in 1972, his medical school training at New York University School of Medicine in 1975, and his internship, residency and hematology/oncology fellowship at Case Western Reserve University Hospitals in 1981. He is board certified in Internal Medicine, Hematology and Medical Oncology and is a fellow of the American College of Physicians and the American Society of Clinical Oncology.

After his training he joined the staff at Cleveland Metropolitan General Hospital (now MetroHealth Medical Center). He came to the Cleveland Clinic in 1989 in the Department of Hematology and Medical Oncology, a department he served as both Vice Chairman, and Acting Chairman. His current appointment is in the Department of Hematology and Medical Oncology of the Taussig Cancer Institute, and he is a Professor of Medicine in the Cleveland Clinic Lerner College of Medicine of Case Western Reserve University.

His interests have focused on the integration of chemotherapy and radiation with surgery in the definitive management of cancers of the upper aerodigestive tract. He continues to be an active clinical investigator, and has conducted a number of multimodality clinical trials at the Cleveland Clinic, and through the Eastern Cooperative Oncology Group, the Southwest Oncology Group and the Radiation Therapy Oncology Group. He has previously served as the co-chairman of the National Cancer Institute Head and Neck Cancer Steering Committee.

He has been a member of the American Society of Clinical Oncology Program Committee, Cancer Education Committee, and Test Materials Development Committee and is the current co-chairman of the ASCO Head and Neck Cancer Guideline Advisory Group. He has served as an associate editor for the journal Head and Neck and has been on the editorial boards of the Journal of Clinical Oncology and Cancer.

Honored by Southern Section - Harold C. Pillsbury, MD FACS

Harold C. Pillsbury, MD FACS, in June 2018 became Emeritus Chair of the UNC Department of Otolaryngology/Head and Surgery.

A native of Baltimore, Maryland, Dr. Pillsbury earned his BA and MD degrees from George Washington University in Washington, DC (1970 and 1972, respectively). He completed his residency training in Otolaryngology/Head and Neck Surgery at the University of North Carolina SOM in 1976. Following six years at the Yale University School of Medicine, he joined the UNC faculty in 1982 as an Associate Professor. He served as Chief of the Division of Otolaryngology-Head and Neck Surgery from 1983 to 2001 at which time UNC Otolaryngology-HNS officially became a department for which he lead as Chair for 36 years. In August of 2018, Dr. Pillsbury was the recipient of "The Order of the Long Leaf Pine" for his dedication and service to the patients of the State of North Carolina.

Dr. Pillsbury has completed an eighteen year term on the American Board of Otolaryngology where he served as Exam Chair and President. He is also past President of the American Academy of Otolaryngology-Head and Neck Surgery, The American Laryngological Association, The Society of University Otolaryngologists, and the Triological Society. He is also past CME coordinator and Vice President of the Southern Section Triological Society. He is the past President of the American Academy of Otolaryngic Allergy.

Dr. Pillsbury has written and/or contributed to over 270 publications and over 45 textbooks. He has also given over 500 presentations nationally and internationally. He has been the primary investigator or co-investigator on over 21 grants. His special field of interest is neurotology and, most especially, cochlear implantation.

Honored by Western Section - Richard E. Davis MD

Richard Davis, MD FACS currently directs the Center for Facial Restoration in Miramar, Florida where he specializes in primary and complex revision rhinoplasty. Prior to entering private practice, Dr. Davis served as Chief of Facial Plastic Surgery at the University of Miami - Miller School of Medicine from 1993 to 2007. His affiliation with the University of Miami continues to the present day with an ongoing appointment as Clinical Professor of Facial Plastic and Reconstructive Surgery, and as the Director of the University of Miami/AAFPRS fellowship program in Facial Plastic Surgery.

Dr. Davis completed his Otolaryngology residency training at the University of North Carolina, and his Facial Plastics fellowship training at Oregon Health Sciences University under Ted A. Cook, MD. Although his former academic practice included all facets of facial reconstructive surgery including craniofacial, congenital, post-traumatic, and oncologic reconstruction, as well as facial aesthetic surgery, his current practice is limited almost entirely to primary and complex revision rhinoplasty.

He is certified by both the American Board of Otolaryngology and the American Board of Facial Plastic and Reconstructive Surgery and has served as an oral board examiner for both organizations on numerous occasions. He is also the immediate past Vice President of Education for the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS). Dr. Davis is recognized for his expertise in complex rhinoplasty and is a frequent author and international speaker on the topic of cosmetic and revision nasal surgery. He has also performed live demonstration rhinoplasty procedures in numerous countries around the world. Dr. Davis has hosted hundreds of national and international observers in his operating room, and he regularly teaches rhinoplasty at CME meetings in the USA and abroad.

Citation Awardees

Eastern Section - Kenneth W. Altman, MD PhD FACS

Dr. Altman is a nationally and internationally renowned physician-surgeon, and an expert in laryngology, care of the professional voice, cough and dysphagia. After receiving his BS from the University of Illinois at Champaign, Dr. Altman went to Duke University for his MS and PhD in Biomedical Engineering prior to obtaining his MD degree. He was at the University of Pennsylvania for residency in Otorhinolaryngology-Head & Neck Surgery, and then completed a fellowship in Laryngology & Care of the Professional Voice at Vanderbilt University. In addition, he has a certificate in Managing Healthcare Delivery from Harvard Business School. Dr. Altman spent six years in Chicago directing the Center for Voice at Northwestern Memorial Hospital, and almost 10 years in New York as Director of the Eugen Grabscheid Voice Center at Mount Sinai Medical Center. In 2014 he joined Baylor College of Medicine in Houston, Texas, as Vice Chair for Clinical Affairs and directs the Institute for Voice and Swallowing. He is also Chief of Otolaryngology at CHI-Baylor St. Luke's Medical Center.

He has over 135 peer reviewed journal articles and book chapters, edited 2 books, and delivered over 250 conference and course presentations, along with receiving multiple awards. Presently Secretary/Treasurer of the American Academy of Otolaryngology-HNS, Dr. Altman is Past President of the American Laryngological Association. He is a fellow of the ALA, American Academy of Otolaryngology, American College of Surgeons, American Rhinological Society, and the Triological Society.

Dr. Altman has numerous research interests, including premalignant vocal fold disease, chronic cough (as a member of the cough guideline committee of the American College of Chest Physicians), and dysphagia in the presence of neurodegenerative disease. At CHI-Baylor St. Luke's Medical Center he has been focusing his efforts on advancing physician-hospital alignment, integrating an academic model into an open-shop environment, as well as physician coordination in a complex mixed health system.

Eastern Section - Ellen M. Friedman, MD FACS

Dr. Ellen M. Friedman is the Director for the Center for Professionalism in Medicine. Prior to this appointment she served as the Chief of Service at the Department of Otolaryngology at Texas Children's Hospital.

Dr. Friedman has been awarded the Arnold P. Gold Foundation Award for Humanism in Medicine, was recognized by the Baylor College of Medicine Academy of Distinguished Educators with the Fulbright and Jaworski Faculty Excellence Award in Teaching and Evaluation, and was awarded the 2016 Distinguished Surgeon Award from the Texas Children's Hospital Department of Surgery. Last year, she received a Macy Foundation Grant to fund a video addressing empathy among physicians, was recognized as a Master Clinician at Baylor College of Medicine for Excellence in Patient Care, and received the Baylor College of Medicine, Distinguished Faculty Award.

Just recently, Dr. Friedman was acknowledged during BCM's Women's History Month as a Women of Excellence, and also received the Baylor College of Medicine's Alumni Association's distinguished Faculty Award.

Eastern Section - Robert M. Kellman, MD FACS

Dr. Kellman graduated from Cornell University and SUNY Upstate Medical Center. He did his general surgery at Montefiore Hospital in the Bronx before completing his Otolaryngology training at Upstate Medical University. He did brief periods of advanced training in Europe first with Prof Bernd Spiessl in Basel and later with Prof Jorem Raveh in Bern, both in Switzerland.

Although his practice was primarily in the field of head and neck, he developed a keen interest in craniomaxillofacial trauma surgery, and became involved with the AO Foundation early in his career; he ran the first AO maxillofacial course in 1984. He is very proud of his successful efforts to assure that AO CMF courses are all multidisciplinary, and these courses have always included ENT, Plastic and Oral Surgery Faculty.

He spent nearly 24 years as Professor and Chair of the Department of Otolaryngology and Communication Sciences at SUNY Upstate Medical University, until his retirement in 2018. His Atlas of Craniomaxillofacial Fixation served as a guide to many young surgeons learning and practicing CMF trauma and reconstructive surgery.

He is proud to have served as president of both the American Board of Facial Plastic and Reconstructive Surgery as well as the American Academy of Facial Plastic and Reconstructive Surgery. He is currently secretary-treasurer of the Eastern Section of the Triological Society.

Middle Section - Michael S. Benninger, MD FACS

Dr. Michael S. Benninger is the Chairman of the Head and Neck Institute at the Cleveland Clinic and is a Professor of Surgery at the Cleveland Clinic Lerner College of Medicine.

He is President of the International Association of Phonosurgery, Vice President of the Voice Foundation and Treasurer of the American Broncho-Esophagological Association. He served on the Board of Directors of the American Academy of Otolaryngology-Head and Neck Surgery for 12 years, as a former Vice President and Chairman Board of Governors. He is Past President of the American Laryngologic Association and the American Rhinologic Society, and past Middle Section Vice President of the Triological Society. He is former Editor-in-Chief of *Otolaryngology-Head and Neck Surgery*. He has served on the Residency Review Committee for Otolaryngology and as a member of the Medical Advisory Board for WebMD. He is Past Chairman of the Sinus and Allergy Health Partnership.

Dr. Benninger has authored/edited 11 books and has 1 additional book in press. He has also has written over 100 book chapters and over 200 scientific articles, focusing on voice care and laryngology and nasal/sinus disease.

A graduate of Harvard University, Dr. Benninger received his medical degree from Case Western Reserve University in Cleveland, Ohio, and completed his residency at the Cleveland Clinic Foundation.

Middle Section - Dennis H. Kraus, MD FACS

Dennis Kraus, MD is the Director of the Center for Head and Neck Oncology within the New York Head & Neck Institute and the Northwell Health Cancer Institute. He is Chair of the Lenox Hill Hospital Cancer Committee, Member of the Cancer Oversight Committee for the Northwell Health System, Professor of Otolaryngology at Donald and Barbara Zucker School of Medicine at Hofstra/Northwell and a Member of the Admissions Committee for the Hofstra School of Medicine. He has served in a number of administrative positions within the otolaryngology and head and neck surgery communities. He has served in multiple roles within the AHNS, including program chair of the annual meeting, Secretary, and past President.

He currently is Chair of the American College of Surgeons Otolaryngology Advisory Council. He serves on the American Joint Commission of Cancer. He is the past president of the North American Skull Base Society, the New York Head and Neck Society and the New York Laryngological Society. He is currently co-editor in chief of the *Skull Base Journal* and associate editor of *Head and Neck Surgery*. He is past chair of the Subspecialty Advisory Council for the American Academy of Otolaryngology-Head and Neck Surgery and the Head and Neck Educational committee and the Home Study Course.

His clinical interest focuses on all aspects of head and neck oncology and his research efforts have paralled his clinical initiatives. He has particular expertise as it relates to minimally invasive thyroid surgery, robotic surgery of the head and neck and sentinel node biopsy for cutaneous malignancies. He has been a strong advocate for the use of minimally invasive surgery in the sinonasal region and skull base. Each of these developments has been associated with decreased morbidity with improved cosmetic and functional outcomes for patients with head and neck neoplasms. Dr. Kraus lives in New York City with his wife of 30 years, Daryl, and has 3 adult children, all of whom are successful in professional positions.

Middle Section - Rod Rezaee, MD

Rod Rezaee, MD, graduated from the Ohio State University School of Medicine and subsequently completed an otolaryngology residency training program at Ohio State. In 2002, he completed a Fellowship in Microvascular Head and Neck Reconstructive Surgery at Mt. Sinai Medical Center in New York.

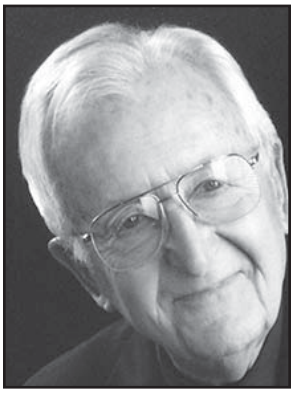
Dr. Rezaee is Director of Head and Neck Surgical Oncology for the UH Ear, Nose & Throat Institute and UH Seidman Cancer Center. He serves as Director of Head and Neck Microvascular Reconstructive Surgery and the UH Head and Neck Surgical Oncology and Microvascular Fellowship program.

He is an accomplished, nationally recognized clinician and researcher with numerous invited speaking engagements, publications and book chapters to his credit. He holds prominent positions within the American Head and Neck Society (AHNS) and the American Board of Otolaryngology-Head and Neck Surgery. Recognized by his peers for his service to microvascular training and innovation, he was asked to hold one of only eight positions on the inaugural governing board for the head and neck reconstructive surgery section of the AHNS.

As a recognized and dedicated educator of medical students, residents and fellows, Dr. Rezaee is the first awardee of the James E. Arnold Resident Teaching Award in the Department of Otolaryngology-Head and Neck Surgery at UH Cleveland Medical Center. He will serve as Principal Investigator for a national head and neck clinical trial at UH in 2019.

Dr. Rezaee and his wife, Sara, have two sons, Grayson (9) and Benjamin (7).

Southern Section - Byron J. Bailey, MD



Byron J. Bailey, MD is the Chairman Emeritus of the Department of Otolaryngology at the University of Texas Medical Branch in Galveston, Texas where he served as the Harry C. Wiess Professor and Chair for 36 years.

His research in the field of laryngeal cancer received the Triological Society's Mosher Award in 1971. He served as the Vice President of the Southern Section of the Triological Society (1996-1997) and was Editor of *The Laryngoscope* (1994-2004). In 2001 he was awarded The Triological Society Gold Medal. Between 1995 and 2011 he made medical mission trips to Vietnam (13 trips), Cuba (6 trips), Ukraine, Poland, and Hungary.

His current focus is serving his church and being a loving husband, father, and grandfather.

Southern Section - Marvin P. Fried, MD FACS

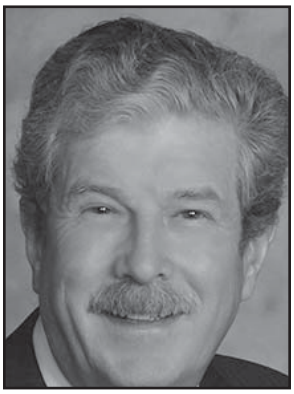
Dr. Fried graduated from Tufts University School of Medicine in 1969, followed by training in Otolaryngology at Washington University School of Medicine, where he also served as a Fellow of the NINDS. He has been on the faculty of Boston University School of Medicine, Tufts University School of Medicine, and Harvard Medical School, being promoted ultimately to Professor of Otology and Laryngology. He served as Chief of Otolaryngology at Brigham and Women's Hospital and Beth Israel Deaconess Medical Center, and Co-Director of the Head and Neck Oncology Program at Dana-Farber Cancer Institute. Dr. Fried is Professor of Otolaryngology - Head and Neck Surgery and University Chairman, Albert Einstein College of Medicine and Montefiore Medical Center.

Dr. Fried received the Fowler Award for Basic Science Research from the Triological Society in 1984, as well as numerous other honors. He has served as President of the Society of University Otolaryngologists-Head and Neck Surgeons, the American Society for Laser Medicine and Surgery, the American Rhinologic Society, and the American Laryngological Association. He has served on the Editorial Boards of the *Archives of Otolaryngology-Head and Neck Surgery*, the *Laryngoscope*, *Ear Nose and Throat Journal*, the *Journal of Clinical Laser Medicine and Surgery, Lasers in Surgery and Medicine*, and the *Annales d'Oto-Laryngologie et de Chirurgie Cervico Faciale*.

His research interests are in the realm of technical applications for the improvement of surgery as it relates to disorders of the head and neck. This has included laser applications and safety, computer assisted and image guided surgery, and surgical simulation. He has been the principal investigator on grants awarded by the Department of Defense and the Agency for Healthcare Research and Quality.

Dr. Fried has investigated the use of sophisticated surgical simulation for training of residents and physicians for endoscopic sinus surgery and its relationship to the improvement of patient safety. He is currently the Director of the Montefiore Einstein Center for Innovation in Simulation. He has authored over 200 original reports, reviews, and chapters, as well as books and monographs. He has been the Senior Editor of three editions of a definitive textbook on laryngeal disorders (The Larynx).

Southern Section - David W. Kennedy, MD FACS



David W. Kennedy, MD, is best known for his work in pioneering endoscopic sinus surgery and minimally invasive endoscopic skull base surgery nationally and internationally. He has served as Chair of the Department of Otorhinolaryngology-Head and Neck Surgery and Vice Dean at the University of Pennsylvania where he also continues clinical practice as Rhinology Professor. A Past President of the American Academy of Otolaryngology-Head and Neck Surgery, the American Rhinologic Society, the International Rhinologic Society and the ISIAN, he helped to establish the subspecialty by developing the first fellowship in rhinology and holding the first courses in endoscopic sinus surgery internationally. His research interests are the pathogenesis of chronic rhinosinusitis and continued development of minimally invasive skull base surgery.

Dr. Kennedy has been elected to the National Academy of Medicine for his contributions to the medical field. He is a prior recipient of the AAO-HNS Board of Governors Practitioner Excellence Award and was awarded the 2010 National Physician of the Year for Clinical Excellence by Castle Connolly, Publishers of America's Top Doctors. He is Editor-in-Chief of the *International Forum of Allergy and Rhinology* and serves on the editorial boards of numerous other journals. He has published approximately 250 articles and chapters and received a number of international awards.

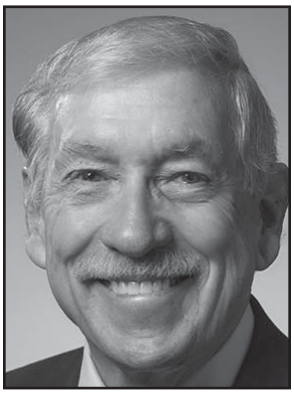
Western Section - William B. Armstrong, MD FACS

Dr. William B. Armstrong joined the Department of Otolaryngology-Head and Neck Surgery at the University of California Irvine in July 1994, and has been department chair since July 2010. He was appointed Professor of Clinical Otolaryngology in July 2009.

Dr. Armstrong's primary clinical and research interests are in head and neck cancer surgery, thyroid and parathyroid surgery. He has a strong interest in minimally invasive procedures to treat head and neck tumors including endoscopic and robotic approaches to head and neck and thyroid tumors. He is actively involved with the Optical Coherence Tomography Project at UC Irvine and Beckman Laser Institute. In addition, he is utilizing office based ultrasound in the outpatient setting and resident education.

Dr. Armstrong has been happily married to his wife, Susan, since 1999 and they have two children: William Harry born December 2000, and Eric Byron born February 2002. Recreational interests include jogging, hiking, backpacking, cooking, planting fruit trees and participating in activities with his two sons. The most recent addition to the family is Ricky, his second lab, who is keeping everyone more active.

Western Section - Roger L. Crumley, MD MBA FACS



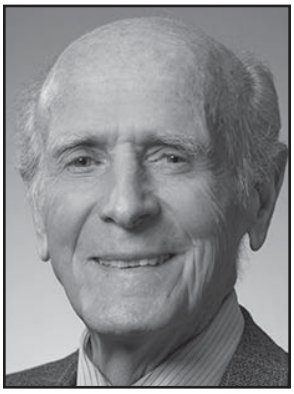
Dr. Crumley, Professor Emeritus of Otolaryngology/Head and Neck Surgery, has served the University of California, Irvine for 30 years. He was Acting Chair then assumed the Chairmanship of the department from 1991-2007. In December, 2012 through April, 2015, Dr. Crumley served as Interim President of University Physicians and Surgeons and Senior Associate Dean for Clinical Affairs for the School of Medicine.

Dr. Crumley has given his time and talents to the Triological Society and many other otolaryngology organizations, and has held the position of President of the American Laryngological Association (2008) and the American Academy of Facial Plastic & Reconstructive Surgery (1995). He served as a Director of the American Board of Otolaryngology from 1992-2004. Dr. Crumley co-founded the Neurolaryngology Study Group with Gayle Woodson in 1989. He has been invited to lecture all over the world, including in China, Russia, Australia, Germany, New Zealand, Croatia, Taiwan, France, Italy, Scotland, Ireland, and Britain.

Dr. Crumley's service and devotion to the Triological Society began in 1982 when he was awarded the Harris P. Mosher Award for his thesis "Experiments in Laryngeal Reinnervation". He was the 6th recipient of the Patrick E. Brookhouser, MD Award for Excellence, awarded in January 2018, which recognized him as a Triological Society Fellow who has made significant scientific or service contributions to the Society and the specialty of Otolaryngology-Head and Neck Surgery. He has been a long-standing member of the membership committee, bringing candidates, including department chairs and residency training program directors, into the fellowship of the Society. Roger was Vice President of the Western Section in 2001 and President of the Triological Society in 2003. One of his favorite memories is from the 2003 meeting of the Middle Section in Indianapolis. As a musician (piano, trumpet, and vocal music) his talents were greatly appreciated by attendees when, together with Dr. Bryan Neel, an impromptu piano duet was performed when the banquet entertainment cancelled due to a snowstorm.

Most important to Dr. Crumley is his family – his wife, Janet, and daughters Danielle and Erin.

Western Section - Victor Passy, MD



Dr. Victor Passy is a general Otolaryngologist in the Department of Otolaryngology-Head and Neck Surgery at the University of California, Irvine School of Medicine.

Dr. Passy received his Doctor of Osteopathic degree in 1959 from the College of Osteopathic Physicians Surgeons, Los Angeles and following a year internship at Los Angeles County General Hospital, he obtained his Medical Degree from California College of Medicine, Los Angeles in 1962. He completed his General Surgery and Otolaryngology Residency in 1967 also at the California College of Medicine, Los Angeles. He was Board Certified by the American Board of Otolaryngology in 1970. Dr. Passy joined the University of California, Irvine in 1969 and by 1972 he accepted the Acting Chief position to the newly developed Otolaryngology Program at UC Irvine.

Dr. Passy also served as Chief of the Department of Otolaryngology-Head and Neck Surgery at Rancho Los Amigos Medical Center in Downey, California from 1968 to 2015.

Over the years, he retained his interest in the evolution of the medical system and quality control of medical care. He has served as a mentor to countless medical students and colleagues during his 50 year career in medicine. He is a Member of the American College of Surgeons, as well as a member of the American Academy of Facial Plastic and Reconstructive Surgery. He continues as member of both the Orange County Medical Society and the California Medical Society.

Dr. Passy has been recognized for his outstanding teaching and continued service in teaching of our residents and medical students and is active with administrative support.

Patrick E. Brookhouser MD Award of Excellence

Stanley M. Shapshay, MD FACS

Dr. Shapshay has been a Professor of Otolaryngology at Albany Medical College for the past 12 years with his practice limited to the subspecialty of Laryngology.

Formerly he was Professor and Chairman of the Otolaryngology Department at Tufts Medical Center and Professor of Otolaryngology at Boston University and at the Mount Sinai School of Medicine in New York City. He is past President of the Triological Society, the ALA and the ABEA. He was the Chairman of the COSM Secretaries Liaison Committee for 8 years. Dr. Shapshay is the author of 190 scientific publications, 3 books and over 40 book chapters. His honors and awards include the Fowler Award from the Triological Society, the ALA Award, the Chevalier Jackson Award (ABEA) and the Daniel Baker Lecturer at the ALA. He has received the Teacher of the Year Award from the following Otolaryngology residency programs: Boston University, Tufts University, Mount Sinai School of Medicine and Albany Medical College.

George Adams, MD Young Faculty Award

Jose P. Zevallos, MD MPH FACS

Dr. Zevallos is a head and neck surgeon-scientist and Division Chief of Head and Neck Surgery in the Department of Otolaryngology/Head and Neck Surgery, at Washington University School of Medicine in St. Louis. He also serves as program director for Head and Neck Surgical Oncology and Microvascular Reconstructive Surgery Fellowship. Dr. Zevallos completed his residency training at Baylor College of Medicine, a head and neck surgery fellowship with Dr. Mark Urken at Mt. Sinai Beth Israel Medical Center in New York City, and a Master of Public Health degree focused on cancer epidemiology at the University of Texas in Houston.

At Washington University, his clinical practice includes the full depth and breadth of head and neck surgical oncology, including an emphasis on transoral surgery for oropharyngeal cancer, salivary gland cancers, and thyroid surgery. In addition, Dr. Zevallos is an NCI funded investigator with an active translational head and neck cancer research laboratory focused on understanding the molecular biology of HPV (+) oropharyngeal cancer.

Dr. Zevallos has published extensively on the genomics and epidemiology of head and neck cancer, and is a frequently invited lecturer at scientific conferences throughout the United States, Europe, and Latin America. Throughout his career, he has been active in national societies and organizations focused on advancing head and neck cancer clinical care, research, and education. He serves as an examiner for the American Board of Otolaryngology, Vice Chair of the Grants Service of the American Head and Neck Society (AHNS), and serves on multiple national committees. He has also been active in editorial and peer review activities for the major journals in our specialty, and currently serves as Associate Editor for *Head and Neck* and as an Editorial Board member for *Oral Oncology*.

Resident Research Awardees

Eastern Section

Rosh K.V. Sethi, MD MPH - Richard J. Bellucci, MD Resident Research Award - Opioid Prescription Patterns and Use among Patients Undergoing Sinus Surgery

Mingyang L. Gray, MD MPH - William W. Montgomery, MD Resident Research Award - Teaching Tracheotomy Management: The Creation of an Active Learning Workshop for Non-Otolaryngology Residents

Sandra H. Ho, MD - John J. Conley, MD Resident Research Award - Case Series with Chart Review of a Novel Chronic Ear Grading System

Middle Section

Brittany A. Leader, MD - Lawrence R. Boies, MD Resident Research Award - Predictors of Hearing in CHARGE Syndrome: Impact of Cochlear Nerve Deficiency and Cochlear Aperture Patency

Eric L. Bauer, MD - Paul H. Holinger, MD Resident Research Award - Extranodal Extension Is a Stronger Prognosticator Than Node Number in HPV Positive Oropharyngeal Squamous Cell Carcinoma

Douglas C. Von Allmen, MD - Francis L. Lederer, MD Resident Research Award - Polysomnographic Outcomes in Children under 3 Years with Mild Obstructive Sleep Apnea Treated with Observation

Southern Section

Cynthia S. Wang, MD - James A. Harrill, MD Resident Research Award - Tracheostomies among Extremely Preterm Infants in the United States - A Cross-Sectional Analysis

Adam J. Van Horn, MD - Frances E. LeJeune Sr., MD Resident Research Award - Neonatal Abstinence Syndrome and Infant Hearing Assessment: A Kids' Inpatient Database (KID) Review

Garrett G. Casale, MD - Lloyd A. Storrs Jr., MD Resident Research Award - Evaluating Correlation between Hearing Loss and Middle Ear Volume in Patients with a Tympanic Membrane Perforation

Western Section

Philip L. Perez, MD - Vice President's Resident Research Award - Long Term Alterations within Cortical Basal Ganglia Cerebellar Networks in Unilateral Vocal Fold Paralysis

Shanmugappiriya Ummaiyal Sivarajah, MD - Shirley Baron Resident Research Award - The Validation of Laryngomalacia Classification Systems: A Multi-Institutional Agreement Study

Triological Society Research Grant Programs

The Society promotes research into the causes of and treatments for otolaryngic diseases by providing financial support for the research efforts of young otolaryngologists-head and neck surgeons. The Society has awarded nearly $5 million to otolaryngologists-head and neck surgeons in support of clinical and basic research, clinical trials, translational research, outcomes research, and health services research. These competitive research grant programs include funding for career development grants and clinical scientist awards. $480,000 was awarded to grant recipients in 2018.

CAREER DEVELOPMENT AWARDS

The purpose of the Career Development awards is to provide support for the research career development of otolaryngologists-head and neck surgeons whose projects have specific application in the field of otolaryngology-head and neck surgery. Funding is $40,000 (non-renewable). Categories of projects that qualify for submission are:

1. Clinical Research - Prospective or retrospective clinical data collection with direct clinical application
2. Basic Research - Laboratory studies, in vivo, in vitro; animal studies, genetic studies
3. Health Services and Outcomes Research - Patient outcomes, health related QOL; epidemiology, diversity, population statistics; cost analysis, modeling, decision analysis, etc.
4. Technology/Procedure Development - Development, standardization, beta testing of new technology; equivalency studies
5. Otolaryngology Status and Trends - Resident and medical education; impact of health care delivery systems in society
6. Historical Perspectives - Medical history as it has influenced contemporary otolaryngology knowledge and practice

Letters of Intent were due December 1, 2018, and applications are due January 31, 2019. Call for proposals will be available later in 2019.

Guidelines and additional information are available at the Triological website - **www.triological.com/researchgrants.html.**

CLINICAL SCIENTIST DEVELOPMENT AWARDS

The Triological Society and the American College of Surgeons combined competitive grant program provides supplemental funding to otolaryngologists-head and neck surgeons who have received a new NIH Mentored Clinical Scientist Development Award (K08/K23) or have an existing award with a minimum of 3 years remaining in the funding period. This award is a means to facilitate the research career development of otolaryngologists with the expectation that the awardee will have sufficient pilot data to submit a competitive R01 proposal prior to the conclusion of the K award. This award provides financial support in the amount of $80,000 per year for up to five years, or for the remainder of the term of existing grants, to supplement the K08/K23 award.

Applications are due May 22, 2019.

Guidelines and additional information are available at the Triological website - **www.triological.com/researchgrants.html.**

Grant Awardees

THE 2018-2019 TRIOLOGICAL SOCIETY CAREER DEVELOPMENT AWARDEES AND THE FUNDED PROJECTS ARE:

- Michael S. Harris, MD -- Medical College of Wisconsin
  Environmental Sound Awareness for Safety Relevant Sounds Among Cochlear Implant Users: Influence of Auditory and Semantic Context

- Joshua M. Levy, MD -- Emory University
  Endocannabinoid Activity in Aspirin Exacerbated Respiratory Disease

- Anais Rameau, MD -- Joan & Sanford I Weill Med College/Cornell University
  Changes in Cough Strength in Patients with Unilateral Vocal Fold Paralysis after Injection Laryngoplasty

- William Russell Ryan, MD FACS -- University of California
  A Prospective Evaluation of Quality of Life Outcomes in Oropharynx Cancer Patients after Transoral Robotic Surgery with Adjuvant Treatment Compared to Definitive Chemoradiation

- Tammara L. Watts, MD PhD FACS -- University of Texas Medical Branch
  Targeting the Tumor Microenvironment in Oral Cavity and Oropharyngeal Squamous Cell Carcinoma

THE 2018-2019 TRIOLOGICAL SOCIETY CLINICAL SCIENTIST AWARDEE AND RENEWAL OF THE FUNDED PROJECT IS:

- Steven J. Eliades, MD PhD - University of Pennsylvania Perelman School of Medicine
  Cortical Mechanisms of Auditory-Vocal Interaction

THE 2018-2019 TRIOLOGICAL/AMERICAN COLLEGE OF SURGEONS CLINICAL SCIENTIST DEVELOPMENT AWARDEES (TRIO/ACS) AND THE FUNDED PROJECTS ARE:

New grant:

- Justin S. Golub, MD -- Columbia University College of Physicians & Surgeons
  Mechanisms Linking Hearing Loss and Alzheimer's Disease and Related Dementias

Renewals:

- Bradley J. Goldstein, MD PhD - University of Miami Miller School of Medicine
  Nasal Progenitor Cells and Olfactory Neurogenesis

- Alexander Tell Hillel, MD - Johns Hopkins University School of Medicine
  Immune Cell Modulation in Laryngotracheal Fibrosis

- Akihiro J. Matsuoka, MD PhD - Northwestern University
  Nanotechnological Regeneration of Spiral Ganglion Neurons with Human Stem Cells

- Rick F. Nelson, MD PhD -- Indiana University School of Medicine
  Genetically Mediated Hair Cell Degeneration in 3D Inner Ear Organoids

THANK YOU

The Society extends a special thank you to the following for their contributions to the 2019 Combined Sections Meeting

Paul Willging, MD - Dr. Willging continues to give of his time and expertise in planning the Combined Sections Meeting Program. This is Dr. Willging's third year as Program Director.

Dana M. Thompson, MD - Dr. Thompson, as Thesis Chair, conducts the Thesis Seminar each January which is open to all candidates for Fellowship as well as potential candidates.

Drs. David Barrs, Michael Hoffer and Al Merati - As founders and coordinators of the Resident Bowl, they have been instrumental in planning and executing the Resident Bowl every year. **Dr. Stacey Gray** joined the Bowl faculty in 2018, and **Dr. Lamont Jones** is joining this year.

National Spasmodic Dysphonia Association has underwritten two travel grants for the 2019 meeting.

Exhibitors - The support of our exhibitors is vital to the meeting. Please visit the exhibitors in the Ballroom and thank them for their support.

Corporate Partners - We gratefully acknowledge our Corporate Partners for their Generous Marketing Support (as of January 1, 2019): **Silver Level - Grace Medical**

THURSDAY, JANUARY 24, 2019

7:30 ***Attendee Breakfast with Exhibitors - Ballroom***

GENERAL SESSION - CROWN ROOM

8:00 **Welcome on behalf of the Section Vice Presidents**
Peak Woo, MD FACS, New York, NY

8:05 **Eastern Section Guest Introductions by Peak Woo, MD FACS, New York, NY, Eastern Section Vice President**
Citation Awardees: Kenneth W. Altman, MD PhD FACS, Houston, TX
Ellen M. Friedman, MD FACS, Houston, TX
Robert M. Kellman, MD FACS, Syracuse, NY
Guest of Honor: Eric M. Genden, MD FACS, New York, NY
The Future of the Academic Department in a Health-System World

8:20 **Southern Section Guest Introductions by Brent A. Senior, MD FACS, Chapel Hill, NC, Southern Section Vice President**
Citation Awardees: Byron J. Bailey, MD, Conroe, TX
Marvin P. Fried, MD FACS, Bronx, NY
David W. Kennedy, MD FACS, Philadelphia, PA
Guest of Honor: Harold C. Pillsbury, MD FACS, Chapel Hill, NC
Impediments to Utilization of New Technology in Patient Care

8:35 **Western Section Guest Introductions by Brian J.F. Wong, MD PhD FACS, Irvine, CA, Western Section Vice President**
Citation Awardees: William B. Armstrong, MD FACS, Irvine, CA
Roger L. Crumley, MD MBA FACS, Irvine, CA
Victor Passy, MD, Irvine, CA
Guest of Honor: Richard E. Davis, MD FACS, Miramar, FL
To be presented in Friday Plastic Surgery session
How Tension Might Prolong Your Longevity - Advances in Nasal Surgery

8:50 **Middle Section Guest Introductions by Pierre Lavertu, MD FACS, Cleveland, OH, Middle Section Vice President**
Citation Awardees: Michael S. Benninger, MD FACS, Cleveland, OH
Dennis H. Kraus, MD FACS, New York, NY
Rod Rezaee, MD, Cleveland, OH
Guest of Honor: David Adelstein, MD, Cleveland, OH
Treatment De-escalation: A Note of Caution

PRESENTATION OF MIDDLE SECTION GEORGE ADAMS, MD YOUNG FACULTY AWARD to Jose P. Zevallos, MD MPH FACS, St. Louis, MO
Introduction by Pierre Lavertu, MD FACS, Middle Section Vice President

Thursday

9:10 **PRESIDENTIAL ADDRESS - Sigsbee W. Duck, MD FACS, Rock Springs, WY**
The Triological Society-An Organization for Academic Practitioners
Introduction by Brian J.F. Wong, MD PhD FACS, Western Section Vice President

9:25 **PRESENTATION OF SEVENTH ANNUAL PATRICK E. BROOKHOUSER, MD AWARD OF EXCELLENCE to Stanley M. Shapshay, MD FACS, Albany, NY**
Introduction by Sigsbee W. Duck, MD FACS, President

9:30 - 10:00 ***Break with Exhibitors/View Posters - Ballroom***

10:05 - 11:00 **TRIOLOGICAL SOCIETY BEST PRACTICES (TRIO BP)**
Moderator: Andrew N. Goldberg, MD MSCE FACS, San Francisco, CA
Panelists: **Is Computed Tomography Necessary before Septoplasty?**
Ashutosh Kacker, MD FACS, New York, NY
What Is the Utility of Fine Needle Aspiration in Parotid Gland Neoplasm?
Samir S. Khariwala, MD, Minneapolis, MN
Does Concomitant Mastoidectomy Improve Outcomes for Patients Undergoing Repair of Tympanic Membrane Perforations?
Robert F. Labadie, MD PhD, Nashville, TN
When Should You Perform Injection Medialization for Pediatric Unilateral Vocal Fold Immobility?
Sukgi S. Choi, MD FACS, Boston, MA
Does Perioperative Skin Preparation Reduce Surgical Site Infection?
Margeaux R. Corby, MD, Charlottesville, VA

11:00 **Q&A**

11:05 - 11:55 **HOW I DO IT: NOT WHEN AND WHY, JUST HOW VIDEO SESSION**
Moderator: Katherine A. Kendall, MD FACS, Salt Lake City, UT
Panelists: **Cartilage Graft Tympanoplasty**
Roland D. Eavey, MD FACS, Nashville, TN
Hypoglossal Nerve Stimulator
Erica R. Thaler, MD FACS, Philadelphia, PA
Office Based Injection Laryngoplasty
Lucian Sulica, MD, New York, NY
Endoscopic Type 3 Laryngeal Cleft Repair Techniques
Vikash Modi, MD, New York, NY

11:55 **Q&A**

12:00 - 1:00 ***Lunch/Visit Exhibits/View Posters - Trailblazers***

1:10 - 3:05 CONCURRENT SESSION 1A
HEAD AND NECK - CROWN ROOM

Moderator: Randal A. Otto, MD FACS, San Antonio, TX

1:10 **2018 TRIOLOGICAL SOCIETY THESIS - WITH DISTINCTION AWARD**
Gene Expression Subtype Analysis of Laryngeal and Oral Cavity Squamous Cell Carcinoma Reveals Novel Molecular Markers of Nodal Metastasis and Survival
Jose Pedro Zevallos, MD MPH FACS, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to: 1) discuss the biologic differences between basal, atypical, mesenchymal, and classical subtypes in head and neck cancer; and 2) discuss the potential role of gene expression subtypes for predicting nodal metastasis and survival in head and neck cancer.

Objectives: Gene expression analyses of head and neck squamous cell carcinoma have revealed four distinct molecular

subtypes: basal, mesenchymal, atypical, and classical. These subtypes show varied mutational and gene expression characteristics and may have predictive or prognostic potential in head and neck cancer. In this study, we conduct a gene expression subtyping analysis in HPV-negative oral cavity (OCSCC) and laryngeal (LSCC) squamous cell carcinoma. We hypothesize that 1) the distribution of gene expression subtypes will differ between OCSCC and LSCC, reflecting tumor heterogeneity in HPV-negative head and neck cancer across anatomic sites; and 2) that gene expression subtypes can be used to predict nodal metastasis and prognosticate survival in head and neck cancer. **Study Design:** Retrospective cohort study and genomic analysis of The Cancer Genome Atlas (TCGA) head and neck cancer cases. **Methods:** Oral cavity and laryngeal squamous cell carcinoma cases were identified from the TCGA head and neck cancer cohort. RNA-Seq by Expected Maximization (RSEM) was used to quantify gene expression levels from TCGA RNA-seq data and to assign each case to one of four subtypes (classical, atypical, basal, mesenchymal). Gene expression heat maps including a reduced 728 gene set as well as a 14 gene set relevant to head and neck squamous cell carcinoma were generated using ConsensusCluster-Plus. Descriptive statistics were used to describe patient, disease and treatment characteristics between each subtype. Cox regression and Kaplan Meier analyses were used to determine associations between gene expression subtype and survival. **Results:** We demonstrate substantive differences in the distribution of gene expression patterns in OCSCC and LSCC. OCSCC cases were comprised primarily of the mesenchymal and basal subtypes, while LSCC was comprised primarily of classical and atypical subtypes. In OCSCC, the mesenchymal subtype, characterized by epithelial to mesenchymal transition expression, was significantly associated with nodal metastasis. In a subset analysis of clinically T1-2N0M0 OCSCC, we demonstrate that the mesenchymal subtype was predictive of occult nodal metastasis (RR=3.38, 95% CI 1.08-10.69). In LSCC, the classical subtype, characterized by KEAP1/NRF2 pathway alterations, was associated with significantly worse overall survival (HR=4.32, 95% CI 1.77-10.54, p=0.001). **Conclusions:** This analysis of gene expression subtypes in OCSCC and LCSCC reveals potential novel markers of nodal metastasis and survival in HPV-negative head and neck cancer, and highlights the biologic heterogeneity of this disease. Future studies will continue to refine and validate these gene expression subtypes, with the goal of providing molecular risk assessments that guide therapy and improve patient outcomes.

1:17 **Head and Neck Mucinous Adenocarcinoma: A Population Perspective**

Samer T. Elsamna, BA, Newark, NJ; Neel R. Sangal, BA, Newark, NJ; Ariel O. Omiunu, BS, Newark, NJ; Richard Chan Woo Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of head and neck mucinous adenocarcinoma, identify certain factors associated with a poor outcome and compare the demographics, prognosis and survival of malignancy with other rare cancers of the head and neck region.

Objectives: Head and neck mucinous adenocarcinoma (H&N-MA) is an exceedingly rare entity that lacks a comprehensive study. We report the first with a focus on demographics, clinicopathology, prognosis and survival. **Study Design:** Data was acquired from the Survival Epidemiology, and End Results (SEER) database with cases from 1973-2014. Statistical significance was set at ± < 0.05 for analyses. **Methods:** 583 cases of mucinous adenocarcinoma were identified from the SEER database. 5, 10, and 20 year disease specific survival (DSS) and overall survival (OS) were measured, and univariate and multivariate analyses were performed to identify associated factors. **Results:** Average age of diagnosis of H&N-MA was found to be 64.8 (±14.8) years. Patients were predominantly white (64.5%), male (55.2%) and most often resided in urban metropolitan areas (87.7%). The most frequent primary site was the eyelid (29.8%) and the majority of patients possessed a lack of nodal involvement (94.1%) and metastasis (96.2%). The DSS and OS rates for all cases were 92.2% and 80.5% respectively. Gender ($p<0.05$) and age ($p<0.001$) were associated with overall survival. Surgery alone had the highest DSS rate (95.2%) among treatment modalities. Significant differences in survival were also noted with primary site, grade and TNM staging. Multivariate regression demonstrated gender, age, grade, staging, primary site and treatment to be independent predictors of survival. **Conclusions:** We report using the largest cohort of H&N-MA to date. While H&N-MA is mostly indolent with a favorable outcome, several prognostic factors including high grade, high TNM staging and a primary site of the parotid gland decrease the survival rate of this malignancy.

1:24 **Paul H. Holinger, MD Resident Research Award - Middle Section**
Extranodal Extension Is a Strong Prognosticator in HPV Positive Oropharyngeal Squamous Cell Carcinoma

Eric L. Bauer, MD, St. Louis, MO; Angela L. Mazul, PhD MPH, St. Louis, MO;
Douglas R. Adkins, MD, St. Louis, MO; Wade L. Thorstad, MD, St. Louis, MO; Jose P. Zevallos, MD MPH FACS, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the recent changes to the AJCC staging of HPV + OPSCC and discuss the implications of these changes. Further, participants should be able to demonstrate an understanding of the importance of extranodal extension in HPV + OPSCC outcomes. Lastly, the audience should be able to understand the risk associated with increased positive nodal number and extranodal extension.

Objectives: To comprehensively examine the prognostic significance of extranodal extension (ENE) in HPV + OPSCC.

To determine whether ENE should be included as a prognosticator in treatment decision making for HPV + OPSCC. **Study Design:** A retrospective cohort of cases diagnosed with HPV + OPSCC from 2010-2015 from the NCDB. **Methods:** Inclusion of all HPV+ cases with appropriate ICD-0-3 codes that received surgery with a neck dissection. Descriptive analysis was performed. We calculated overall survival as the time from diagnosis to either date of death due to any cause or censoring. Kaplan-Meier all cause survival plots were constructed, and log rank p values were calculated. Hazard ratios (HR) for the independent effects of ENE and N stage with overall survival were estimated by Cox proportional hazards regression. **Results:** Cases that were ENE negative had the highest five year survival (92.6%; 95% confidence interval (CI):90.5%, 94.7%). ENE positive cases had the lowest five year survival (84.0%; 95% CI: 80.7%, 87.4%). After adjusting for confounding variables, ENE positivity was associated with almost twice the hazard of death (1.91 95% CI: 1.36, 2.67) compared to ENE negative cases. N1 with ENE positivity is associated with a 1.90 (95% CI: 1.28, 2.82) times hazard of death compared with N1, ENE negative cases. Compared to N1/ENE negative, N2/ENE positive cases had the poorest survival (HR: 2.93; 95% CI: 1.94, 4.44). **Conclusions:** The implementation of the new AJCC 8th edition staging system provides a much improved framework to develop and discuss treatment plans for HPV + OPSCC. We feel that careful consideration should be given to the importance of ENE in patients with HPV + OPSCC.

1:31 **Cranial Nerve Outcomes Following Parotid Basin Recurrences and Salvage Parotidectomy for Cutaneous Head and Neck (H&N) Melanoma: Importance of Early Regional Control in the Parotid Basin**

John E. Hanks, MD, Ann Arbor, MI; Kevin J. Kovatch, MD, Ann Arbor, MI; Syed A. Ali, MD, Ann Arbor, MI; Josh D. Smith, BA, Ann Arbor, MI; Scott A. McLean, MD PhD, Ann Arbor, MI; Carol R. Bradford, MD, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the importance of early locoregional disease control in the parotid nodal basin in head and neck melanoma due to the risk of cranial nerve injury associated with regional disease progression and/or salvage surgery.

Objectives: To compare cranial nerve outcomes of parotid basin recurrences in cutaneous H&N melanoma requiring salvage parotidectomy versus immediate parotidectomy following positive sentinel lymph node biopsy (SLNB). **Study Design:** Single institution retrospective review. **Methods:** H&N melanoma patients undergoing SLNB +/- completion nodal dissection (CND) from 1997-2007 were reviewed. **Results:** 357 patients were identified, with mean age 53.5+/-19.0 years, mean Breslow depth 2.52+/-1.87mm, and 4.8 years median followup. 105 (29.4%) patients had sentinel node(s) mapping to the parotid basin. 18 patients had positive parotid sentinel nodes and underwent immediate parotidectomy/CND, with three showcasing additional positive intraparotid nonsentinel lymph nodes. 15 patients recurred in the parotid bed: 4 with negative parotid SLN's, 2 with positive parotid SLN's (CND included superficial parotidectomy), 2 with positive postauricular SLN's (CND did not include parotidectomy), and the remainder had negative SLNB's mapping elsewhere. Parotid recurrences were multiple and extensive (4.87 mean recurrent nodes, n=3 with +ECE), and all required salvage nodal dissection including parotidectomy. No cranial nerve injuries were observed following immediate parotidectomy/CND. Conversely, 6 long term CN VII injuries were noted following salvages, including 2 complete and 4 single branch weaknesses. Among patients with long term facial weakness, 2 intraoperative sacrifices of CN XI and/or SCM were required. **Conclusions:** Parotid basin melanoma recurrences are often advanced, conferring marked risk of CN involvement/injury during salvage that is not seen in immediate parotidectomy. Further, immediate superficial parotidectomy for positive intraparotid SLNB may impose risk of intraparotid recurrence. This study argues the importance of early disease control in the parotid basin, potentially including deep parotid lobe dissection.

1:38 **Impact of Perioperative Pain Management Protocol on Opioid Prescribing Patterns**

Max M. Scher, BS, Cleveland, OH; Kate L. Clancy, MD, Cleveland, OH (Presenter); Jason E. Thuener, MD, Cleveland, OH; Emily N. Ahadizadeh, MD, Cleveland, OH; Chad A. Zender, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of a pain management protocol on opioid prescribing patterns.

Objectives: Demonstrate the impact of preoperative education, patient risk stratification, and a postoperative protocol on opioid prescribing patterns in a head and neck practice. **Study Design:** Retrospective chart review. **Methods:** All patients presenting to our head and neck providers completed the Opioid Risk Tool at their initial appointment to separate patient populations into low vs high risk. Procedures were paired with a postoperative pain regimen based on that risk. Here we compare prescribing patterns for procedures with anticipated mild pain (thyroidectomy, parotidectomy, parathyroidectomy, sentinel lymph node biopsy, open lymph node biopsy, submandibular gland excision) before and after the implementation of our protocol. Patient satisfaction was tracked with the Revised American Pain Society Patient Outcome Questionnaire. **Results:** A total of 160 patients were identified that met inclusion criteria. 40 patients were before and 120 patients were after implementation of our protocol. After implementation of our protocol, we prescribed significantly less number of pills (25 vs 33 p <0.0001) to each patient. We also increased the number of patients that were not given an opioid prescription at all (19% vs 8% p=0.1). Tramadol became our most common opioid used (60%). Nearly 30% of our patients did not fill

their prescription following surgery. 88% of patients reported an overall satisfaction of 8/10 with our new pain regimen. **Conclusions:** Preoperative education, patient risk stratification, and a specific postoperative pain management protocol can significantly decrease the amount of potent opioids prescribed without compromising patient satisfaction.

1:45 **Observed to Expected Ratio for Adherence to Treatment Guidelines as a Quality of Care Indicator for Laryngeal Cancer**

Warren C. Swegal, MD, Baltimore, MD; Robert J. Herbert, BS, Baltimore, MD; David W. Eisele, MD, Baltimore, MD; Jenny Chang, Irvine, CA; Robert E. Bristow, MD MBA FACS, Irvine, CA; Christine G. Gourin, MD MPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to explain what the observed to expected ratio for guideline adherence is and how it affects quality of care at hospitals treating laryngeal cancer.

Objectives: To examine associations between survival and adherence to National Comprehensive Cancer Network (NCCN) treatment guidelines using an observed to expected (O/E) ratio for greater adherence as a risk adjusted hospital measure of quality care in elderly patients treated for larynx cancer. **Study Design:** Retrospective analysis of Surveillance, Epidemiology, and End Results (SEER) Medicare data. **Methods:** We evaluated 1,721 patients diagnosed with larynx cancer from 2004-2007 using multivariate regression and survival analysis. Using a quality indicator derived from NCCN guidelines for recommended treatment reflecting guideline adherence, an O/E ratio was calculated for each hospital and categorized by hospital volume. **Results:** The majority of hospitals were low volume hospitals treating <= 6 cases (75%), with a mean O/E of 0.94±0.39. Hospitals treating >6 cases with an O/E<1 (23%) had a mean O/E of 0.77±0.19, and hospitals treating >6 cases with an O/E>1 (33%) had a mean O/E of 1.15±0.09. Treatment at higher volume hospitals with an O/E>1 was associated with improved survival (hazard ratio 0.84 [0.70-1.00]), and lower mean incremental treatment related costs (-$2,976 [-$5,277- -$674]), compared with hospitals with an O/E<1 and the reference group of low volume hospitals. **Conclusions:** Greater adherence to NCCN treatment guidelines for larynx cancer care in elderly patients, combined with a minimum case volume criterion, is associated with improved survival and lower treatment related costs, and may be a feasible measure of larynx cancer quality of care.

1:52 **Tumor Infiltrating Lymphocyte Density Improves the Prognostic Resolution of AJCC 8th Edition Staging for HPV Positive Oropharyngeal Carcinoma**

Farhoud Faraji, MD PhD, San Diego, CA; Nicholas Fung, BS, Baltimore, MD; Christine C. Gourin, MD, Baltimore, MD; David W. Eisele, MD, Baltimore, MD; Lisa M. Rooper, MD, Baltimore, MD; Carole Fakhry, MD MPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the prognostic role of tumor infiltrating lymphocytes in HPV positive oropharyngeal carcinoma.

Objectives: To evaluate if a simple method for assessing tumor infiltrating lymphocyte density improved the prognostic value of the American Joint Committee on Cancer, 8th edition (AJCC8) cancer staging system in recurrent human papillomavirus positive oropharyngeal squamous cell carcinoma (HPV-OPC). **Study Design:** Retrospective cohort study. **Methods:** TIL density (lymphocytes per square millimeter) was quantified on hematoxylin and eosin stained primary tumor specimens from patients presenting to our hospital between 2009 and 2017. Clinicopathologic characteristics were obtained through retrospective chart review. The prognostic effect of TIL density was evaluated with the Kaplan-Meier method and Cox Proportional Hazards models considering recurrence free survival (RFS) as the primary outcome. **Results:** This study included 132 patients with HPV-OPC with 15 recurrences. Median followup time was 28.6 months. Of these patients, 82% were classified as clinical stage (cStage) I and 13% as cStage II. Among patients with cStage I disease, TIL high tumors were associated with improved RFS compared to TIL low tumors (p=0.021). Multivariate analysis showed patients with cStage I disease and TIL high tumors had a 79% reduced risk of recurrence (aHR: 0.21, 95% CI: 0.06-0.75, p=0.016) compared to patients with TIL low tumors. Similar trends were observed among patients with cStage II disease. TIL density also stratified risk in AJCC8 pathologic stage I disease. **Conclusions:** In patients with AJCC8 stage I disease, low TIL density was associated with diminished RFS. Our data suggest that a simple method for assessing TIL abundance on H&E stained primary tumor specimens may enhance the prognostic resolution of the AJCC 8th edition staging criteria for HPV-OPC.

1:59 **Q&A**

2:10 - 3:00 **THYROID CANCER - WHERE ARE WE NOW?**
Moderator: Michael C. Singer, MD, Detroit, MI
Panelists: **Molecular Markers**
Robert L. Witt, MD FACS, Newark, DE
Neuromonitoring
Gregory W. Randolph, MD FACS, Boston, MA
Hemi vs Total Thyroidectomy for T2 Well Differentiated Thyroid Cancers
Eric M. Genden, MD FACS, New York, NY
Active Surveillance for Thyroid Carcinoma
Marilene B. Wang, MD FACS, Los Angeles, CA

3:00 **Q&A**

3:05 - 3:30 ***Break with Exhibitors/View Posters - Ballroom***

1:10 - 3:10 CONCURRENT SESSION 1B
OTOLOGY/NEUROTOLOGY - CAROUSEL ROOM

1:10 - 2:05 **CONTROVERSIES IN OTOLOGY/NEUROTOLOGY**
Moderator: M. Jennifer Derebery, MD FACS, Los Angeles, CA
Panelists: **Decision Making in Meniere's Disease: Medical vs. Surgical**
Clough Shelton, MD FACS, Salt Lake City, UT
Autoimmune Inner Ear Disease: Beyond Steroids
Michael Hoa, MD, Washington, DC
To Hybrid or Not to Hybrid in Cochlear Implantation: Is More Better?
Joni K. Doherty, MD PhD FACS, Seal Beach, CA
Management of Tinnitus: Fact or Fiction?
Carol A. Bauer, MD FACS, Springfield, IL
Eustachian Tube Balloon Dilatation: Help vs Hype
Jennifer L. Maw, MD, San Jose, CA

2:05 **Q&A**

Moderator: Arun K. Gadre, MD MS FACS, Prospect, KY

2:10 **Combining Stereoscopic Video with Modular 3D Anatomic Models for Lateral Skull Base Training**
Samuel R. Barber, MD, Tucson, AZ; Saurabh Jain, MS, Tucson, AZ; Young-Jun Son, PhD, Tucson, AZ; Shawn M. Stevens, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants will learn about stereoscopic video and interactive 3D anatomic models, and understand how 3D visual cues could supplement learning for trainees in lateral skull base surgery.

Objectives: Current virtual reality (VR) technology allows for the creation of instructional video formats that incorporate three dimensional (3D) stereoscopic footage. Combined with 3D anatomic models, any surgical procedure or pathology could be represented virtually to supplement learning or surgical preoperative planning. We propose a VR app that allows trainees to interact with modular 3D anatomic models corresponding to stereoscopic surgical videos. **Study Design:** Virtual simulation. **Methods:** Stereoscopic video was recorded using an OPMI Pentero 900 microscope (Zeiss, Oberkochen, Germany). DICOM images of axial temporal bone CT were segmented and each anatomic structure was exported separately. 3D models included semicircular canals, facial nerve, sigmoid sinus and jugular bulb, carotid artery, tegmen, canals within the temporal bone, cochlear and vestibular aqueducts, endolymphatic sac, and all branches for cranial nerves VII-VIII. Finished files were imported into the Unreal Engine and programmed in Unreal Studio. The resultant application was viewed using an Oculus GO. **Results:** A VR environment facilitated viewing of stereoscopic video and interactive model manipulation using the VR controller. Interactive models allowed users to toggle visibility and labels for each anatomic structure. Based on 20 variable components, a value of 1.1x10^12 combinations of structures per DICOM series were possible for representing patient specific anatomy in 3D. **Conclusions:** This investigation provides proof of concept that a hybrid of stereoscopic video and VR simulation is possible, and that this tool may significantly aid LSB trainees as they learn to navigate a complex 3D surgical environment. Future studies will validate methodology.

2:17 **2018 TRIOLOGICAL SOCIETY THESIS - WITH DISTINCTION AWARD**
Evaluation and Treatment of Pulsatile Tinnitus Associated with Sigmoid Sinus Wall Anomalies
David J. Eisenman, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to define and identify sigmoid sinus wall anomalies, describe the association of sigmoid sinus wall anomalies with transverse sinus stenosis, and identify patients with pulsatile tinnitus due to sigmoid sinus wall anomalies who are at higher risk of failure with surgical treatment.

Objectives: Determine factors predictive of success in sinus wall reconstruction (SWR) for pulse synchronous tinnitus (PST) associated with sigmoid sinus wall anomalies (SSWA). **Study Design:** Retrospective case series. **Setting:** Tertiary referral academic practice. **Patients:** Forty consecutive patients with PST associated with SSWA, undergoing transtemporal SWR. **Intervention:** Transtemporal SWR. **Main Outcome Measure:** Resolution of PST. **Results:** Twenty-three patients had isolated sinus wall dehiscence, and 17 had diverticulum. Thirty-six out of forty patients (90%) had complete resolution of their PST following SWR. All of the non-responders had unilateral left sided dehiscence. None of the non-responders had an associated transverse sinus stenosis (TSS) or empty sella syndrome (ESS). A favorable response to surgery was strongly associated with the presence of TSS for the entire cohort, and with the presence of ESS for those with dehiscence alone. **Conclusions:** SWR has a high rate of success in appropriately selected patients. Patients with SSWA and PST have a high rate of associated TSS and ESS. Patients with sinus wall dehiscence without diverticulum, TSS or ESS are less likely to respond to SWR. These data suggest a multifactorial cause of PST in at least some patients with SSWA.

2:24 **Imaging Findings in Pediatric Single Sided Deafness and Asymmetric Hearing Loss**
Noga Lipschitz, MD, Cincinnati, OH; Gavriel D. Kohlberg, MD, Cincinnati, OH; Nicholas Roetting, BS, Cincinnati, OH; Michael Scott, AuD, Cincinnati, OH; John H. Greinwald, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the various anatomic etiologies in pediatric SSD and ASH identifiable on imaging studies.

Objectives: Examine the imaging findings on computer tomography and magnetic resonance imaging in pediatric single sided deafness (SSD) and asymmetric hearing loss (ASH). **Study Design:** Retrospective chart review. **Methods:** The medical records of 213 pediatric patients with SSD and ASH were reviewed and imaging findings were compared. SSD was defined as unilateral profound hearing loss and contralateral normal hearing ear. In the ASH group, ASHw was defined as the worse hearing ear, not usable for speech understanding, while ASHb was defined as the better hearing ear, with hearing loss that was nevertheless usable for speech understanding. **Results:** After twenty-four patients were excluded for missing imaging data, there were 170 patients with SSD and 19 patients with ASH. In the SSD group, 87 patients (51.2%) had imaging findings associated with HL. In the ASH group, such imaging findings were found in 13 (68.4%) of the ASHw and in 5 (26.3%) of the ASHb ears. The most common finding in the SSD group was cochlear nerve aplasia (24.7%), followed by cochlear dysplasia (19.4%) and enlarged vestibular aqueduct (EVA) (12.9%). In the ASH groups, cochlear dysplasia was seen in 3 (15.8%) of ASHw ears and in 2 (10.5%) of the ASHb ears, and EVA was seen in 1 of each subgroup (5.3%). **Conclusions:** Imaging studies identified the etiology in over half of the cases of SSD and ASHw and in over a quarter of the ASHb patients. Our findings strongly support the use of imaging studies in the evaluation of pediatric SSD and ASH.

2:31 **Middle Cranial Fossa Approach for Management of Spontaneous Cerebrospinal Fluid Leaks: An Analysis of Audiometric Outcomes**
Mohamedkazim M. Alwani, MD, Indianapolis, IN; Elhaam H. Bandali, MS, Indianapolis, IN; Lauren M. Van Buren, BS, Indianapolis, IN; Charles W. Yates, MD, Indianapolis, IN; Rick F. Nelson, MD PhD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should gain an understanding of postoperative audiometric outcomes, including subset trends in pure tone averages and air bone gaps, after middle cranial fossa approach for repair of spontaneous cerebrospinal fluid leaks.

Objectives: To determine whether the middle cranial fossa (MCF) approach to repair spontaneous cerebrospinal fluid (sCSF) leaks is an audiometrically sound procedure and if improvement in conductive hearing loss is an achievable goal with this technique. **Study Design:** Retrospective cohort study. **Methods:** Adults with sCSF otorrhea were reviewed from January 2014 to January 2018 if they underwent MCF approach for repair. Audiometric evaluations were performed preoperatively and postoperatively. The primary outcomes measures were pre to postoperative changes in pure tone average (PTA) and air bone gap (ABG). Three subset analyses were performed for outcomes comparisons. The first subset analyzed the impact of tegmen defect plurality on postoperative hearing. The second subset compared audiometric

outcomes in relation to defect location. The third subset examined the impact of encephaloceles on post-reconstructive hearing. **Results:** The cohort (n = 15) demonstrated significant improvement in mean PTA ($p < 0.001$, $d = 1.46$) and ABG ($p < 0.001$, $d = 1.31$). On subset analysis, ears with multiple tegmen defects had a greater improvement in PTA and ABG than ears with single defects. Regardless of location of defects, patients exhibited overall improvement of PTA and ABG. Lastly, patients with encephaloceles demonstrated greater improvements in primary outcome measures as compared to those without. **Conclusions:** MCF approach for repair of sCSF leaks yields significant improvement in conductive hearing loss. Therefore, not only is the MCF approach a safe way to manage clear otorrhea in patients with sCSF leaks, the resulting hearing loss from sCSF leaks can also be successfully managed using this approach.

2:38 **Lawrence R. Boies, MD Resident Research Award - Middle Section**
Predictors of Hearing in CHARGE Syndrome: Impact of Cochlear Nerve Deficiency and Cochlear Aperture Patency
Brittany A. Leader, MD, Cincinnati, OH; Kareem O. Tawfik, MD, San Diego, CA; Zoe A. Walters, BA, Cincinnati, OH; Daniel I. Choo, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the extent that cochlear nerve deficiency and cochlear aperture patency are associated with hearing loss severity in CHARGE syndrome. Participants will also be able to discuss the relationship of cochlear nerve deficiency with hearing outcomes after cochlear implantation.

Objectives: 1) Determine if extent of cochlear nerve deficiency (CND) is associated with hearing loss severity in CHARGE Syndrome (CS); 2) describe the relationship of cochlear aperture (CA) patency with hearing thresholds in CS; and 3) examine the relationship of CND with hearing outcomes after cochlear implantation (CI). **Study Design:** Retrospective chart review. **Methods:** Retrospective review of randomly selected CS patients at a quaternary care center. All patients underwent audiometry as well as MRI and CT of the temporal bones. Cochlear nerves (CN) were characterized as normal, hypoplastic, or aplastic. Patients with normal CN bilaterally were excluded. CA was characterized as normal, stenotic, or absent. Hearing levels were stratified based on pure tone averages and converted to a 5 point scale (normal=0, mild=1, moderate=2, moderate-severe=3, severe=4, or profound=5). **Results:** Twenty-eight patients (56 temporal bones) were included. Eight (14%), 19 (34%), and 29 (52%) demonstrated normal, hypoplastic, and aplastic CN, with mean hearing levels moderate-severe (3.4/5), severe (4.4/5), and profound (4.5/5), respectively. Eleven (28%), 16 (41%), and 12 (31%) had normal, stenotic, and absent CA, with mean hearing levels of severe (3.8/5), severe (4.2/5), and profound (4.8/5), respectively. After CI, three hypoplastic CN ears improved from profound to mild, and one from profound to severe. One aplastic CN ear had no improvement with a CI. **Conclusions:** Our findings suggest neither degree of CND nor presence of CA stenosis predicts hearing thresholds. However, CA absence commonly portends profound hearing loss and clinically significant CND. Radiographic CN assessment is insufficient to predict hearing levels or outcomes after CI in CS.

2:45 **Middle Fossa Microsurgical Facial Nerve Decompression in Patients with Idiopathic Recurrent Facial Nerve Paralysis: Outcomes of Surgical Management in a Rare Clinical Entity**
Christopher Blake Sullivan, MD, Iowa City, IA; Vivan L. Zhu, BS, Iowa City, IA; Daniel Q. Sun, MD, Baltimore, MD; Marlan R. Hansen, MD, Iowa City, IA; Bruce J. Gantz, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to better understand this rare clinical entity, discuss the role of microsurgical decompression in idiopathic recurrent facial nerve paralysis, and also discuss the value as a definitive treatment modality to decrease future episodes of facial paralysis.

Objectives: To evaluate the postoperative facial nerve dysfunction, audiometric outcomes, and long term quality of life outcomes of patients with idiopathic recurrent facial nerve paralysis (RFP) after middle cranial fossa (MCF) microsurgical decompression. **Study Design:** Retrospective chart review. **Methods:** Eleven consecutive patients (mean age 37.0 years, range 5-67) who underwent MCF facial nerve decompression. Outcome measures included pre and postoperative House-Brackmann (HB) score, pre and postoperative pure tone average (PTA), pre and postoperative word recognition scores (WRS), and postoperative Facial Clinimetric Evaluation (FaCE) survey. **Results:** Mean number of preoperative facial paralysis episodes was 3.3 (range 2-6) and preoperative HB score was 4.5 (range 1-6). Postoperatively, 0 patients had further episodes of facial nerve paralysis at an average of 8.8 years (range 34 days 17.8 years) ($p = 0.003$), and the average postoperative HB score was 2.1 (range 1-3) ($p = 0.011$). Postoperative audiometry was stably maintained as assessed with PTA and WRS scores. **Conclusions:** Microsurgical facial nerve decompression for idiopathic RFP may be a reliable therapeutic modality to prophylactically decrease the number of facial nerve paralysis episodes and may also help to improve facial nerve functional status.

2:52 **Ototoxicity Study of Topical Middle Ear Proflavine Application**
Enrique R. Perez, MD MBA, Miami, FL; Cima P. Maliakal, BS, Miami, FL; Esperanza Bas, PhD, Miami, FL; Simon I. Angeli, MD, Miami, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) demonstrate an understanding of the potential use of proflavine as an intraoperative fluorescent targeting agent in cholesteatoma surgery; 2) discuss the obstacles to this application presented by the ototoxicity findings of this study; and 3) discuss the direction of future investigations to overcome this obstacle in order to study the promising applicability of this fluorescent marker.

Objectives: Evaluate the ototoxicity of proflavine as a prerequisite to studying its promising role as a topical fluorescent agent for targeting residual cholesteatoma matrix in chronic ear surgery. **Study Design:** In vivo animal model of middle ear topical proflavine application. **Methods:** The right middle ears of 10 rats were surgically accessed and 0.01% proflavine hemisulfate solution was topically applied to the round window niche for 5 minutes. Contralateral ears served as vehicle controls. Pre- and post- treatment auditory brainstem response (ABR) thresholds for pure tone stimuli at 1, 4, 8, 16 and 32 kHz as well as distortion product otoacoustic emission (DPOAE) responses were recorded. Testing was performed at baseline, 1, 2, 4, 8 and 12 weeks post-treatment. Animals were then euthanized and their cochleas harvested for histologic analysis. Confocal microscopy was used to count stereociliary bundles, as well as inner and outer hair cells. **Results:** Post-treatment ABR thresholds at 1 and 16kHz were significantly higher in experimental ears compared to controls ($p<0.01$). Following treatment, experimental ears demonstrated significantly diminished DPOAE responses at higher frequency stimulations, which also translated to a significant difference compared to control ears at the corresponding frequencies ($p<0.01$). Nevertheless, histologic analysis did not yield significant differences in hair cell counts or stereociliary bundles between groups. **Conclusions:** Proflavine may lead to a low grade of otoxicity without significant histologic changes at the hair cell level. Decreasing middle ear exposure time and or concentration levels may negate proflavine's ototoxic effects allowing its use as a tool to lower recidivism in cholesteatoma surgery.

2:59 **Q&A**

3:05 - 3:30 ***Break with Exhibitors/View Posters - Ballroom***

3:30 - 5:15 CONCURRENT SESSION 2A
RHINOLOGY/ALLERGY - CROWN ROOM

Moderator: Ralph B. Metson, MD FACS, Boston, MA

3:30 **Utilization and Reimbursements for Sinus Procedures: A Five Year Analysis**
Lindsey K. Koester, MD, Pittsburgh, PA; Parul Goyal, MD MBA, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the utilization and growth of balloon sinus procedures with that of non-balloon traditional endoscopic sinus surgery.

Objectives: Balloon sinuplasty has become an increasingly popular option for patients undergoing surgical treatment of sinusitis. This study analyzes utilization and growth of these procedures across a large cohort of patients over a five year period. **Study Design:** Retrospective review of Medicare utilization and billing data. **Methods:** Utilization and payment values were obtained from Medicare claims data using CMS datasets (http://www.cms.gov). All Medicare claims were analyzed from 2012-2016. Data was extracted for balloon sinuplasty and endoscopic sinus surgery claims. Procedure location, total submitted claims, charges, and payments were compared. **Results:** From 2012-2016, the number of balloon procedures increased from 5,683 to 25,791. Traditional sinus surgery procedures increased from 27,896 to 33,878. Aggregate Medicare payments to otolaryngologists for endoscopic sinus surgery have remained relatively stable, whereas there has been a 450% increase in total payments for balloon sinuplasty. In 2016, total payments for balloon procedures ($40.6M) were substantially higher than payments for non-balloon based endoscopic sinus surgery ($16.2M). Providers performing traditional sinus surgery have increased 17% over five years, while the number performing balloon procedures has increased 277%. **Conclusions:** There has been a rapid expansion in the number of sinus procedures in the Medicare population from 2012-2016. Office based balloon procedures account for the overwhelming majority of the increases in procedures and payments. Traditional endoscopic sinus surgery procedures still outnumber balloon procedures in the Medicare population. Per procedure and aggregate payments are now higher for sinuplasty procedures than for traditional sinus surgery.

3:37 **Contemporary Analysis of Otolaryngic Allergy**
Willard C. Harrill, MD FACS, Hickory, NC; Gavin Setzen, MD FACS, Albany, NY; Harold C. Pillsbury, MD FACS, Chapel Hill, NC

Educational Objective: Compare the relevant pathways to clinical competency, level of clinical integration and testing/

treatment preferences in contemporary otolaryngic allergy.

Objectives: Investigate otolaryngologist perception of duration to competency, level of integration and testing/treatment trends within otolaryngic allergy (OA). **Study Design:** Cross-sectional online survey of active American Academy of Otolaryngic Allergy (AAOA) members. **Methods:** A 25 question survey was developed and emailed to 1632 active AAOA members from March 15 - April 14, 2018. **Results:** A 27.3% survey response rate was achieved with regional responses proportional to the AAOA membership distribution surveyed ($R2 = 0.95$; $p < 0.001$) demonstrating no significant regional response bias ($p = 0.428$). Self-reported duration to achieving OA competency was 5.8 years after completing residency. Physicians who reported that they had achieved OA competency were more likely to be board certified ($p < 0.001$) and achieved AAOA fellowship status ($p < 0.001$). The most valuable educational resource towards achieving OA competency was through the AAOA with residency training being least valuable. Allergy services were offered within 91.5% of respondent's practices. Among immunotherapy treatment options, subcutaneous injections (SCIT) predominated at twice the utilization of sublingual immunotherapy (SLIT). Allergy immunotherapy tablets were rarely utilized. Home allergy shots were offered by 45.2% of respondents. In-office immunotherapy vial compounding was preferred (95.8%) to utilizing third party vendors. Diversity of allergy related services offered beyond inhalant/seasonal allergies found food allergy (63.5%), asthma (44.9%), allergic fungal sinusitis (43.8%), penicillin allergy (18%), stinging insect allergy (12.6%), and aspirin desensitization (3.9%) clinical integration rates. **Conclusions:** It is striking to note the fairly long time interval to reported OA competency after residency. Further investigation into the value of current and future educational/clinical training resources is warranted given the current clinical integration and sophistication of clinical OA reported. Future studies should also focus on the outcomes of OA as a comanagement treatment option for sinonasal and combined airway disease as otolaryngology is uniquely positioned to integrate comprehensive OA treatment protocols alongside the surgical expertise of the specialty within a clinical sino-allergy clinical home.

3:44 **Clinical and Demographic Traits Characterizing a High Frequency of Acute Exacerbations of Chronic Rhinosinusitis Disease Phenotype**

Katie M. Phillips, MD, Boston, MA; Lloyd P. Hoehle, BA BS, Boston, MA; David S. Caradonna, MD DMD, Boston, MA; Stacey T. Gray, MD, Boston, MA; Ahmad R. Sedaghat, MD PhD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to list the traits found to be associated with CRS patients who have a high frequency of acute exacerbations of CRS.

Objectives: Acute exacerbations of chronic rhinosinusitis (AECRS) are associated with significant quality of life decreases. We sought to determine characteristics associated with high AECRS frequency in chronic rhinosinusitis (CRS). **Study Design:** Cross-sectional study of 209 patients with CRS. **Methods:** Patients reported number of sinus infections, CRS related antibiotics and CRS related oral corticosteroids taken in the last 12 months were used as metrics for AECRS frequency. Sinonasal symptom burden was assessed with the 22 item Sinonasal Outcome Test (SNOT-22). Ninety patients reporting 0 for all AECRS metrics were considered to have had no AECRS in the prior 12 months. One hundred and nineteen patients reported >3 on at least one AECRS metric and were considered as having high AECRS frequency. Characteristics associated with patients with high AECRS frequency were identified using exploratory regression analysis. **Results:** High AECRS frequency was positively associated with comorbid asthma (adjusted odds ratio [ORadj]=3.68, 95%CI: 1.42 9.54, p=0.007) and SNOT-22 (ORadj=1.06, 95%CI: 1.04 1.09, p<0.001) with a trend towards association for a history of previous sinus surgery (ORadj=1.87, 95%CI: 0.92 3.84, p=0.086). Polyps were negatively associated (ORadj=0.27, 95%CI: 0.11 0.68, p=0.005) with high AECRS frequency. SNOT-22 score of > / = 24 identified patients with high AECRS frequency with sensitivity of 93.3% and specificity of 57.8%. Comorbid asthma had 39.5% sensitivity but 78.9% specificity while not having polyps had 74.8% sensitivity but 44.4% specificity for identifying patients with high AECRS frequency. **Conclusions:** In total, these results point to a CRS disease phenotype of high AECRS frequency characterized by high sinonasal disease burden with comorbid asthma but interestingly without polyps.

3:51 **Richard J. Bellucci, MD Resident Research Award - Eastern Section**
Opioid Prescription Patterns and Use among Patients Undergoing Sinus Surgery

Rosh K.V. Sethi, MD MPH, Boston, MA; Ashley L. Miller, MD, Boston, MA; Ryan A. Bartholomew, BS, Boston, MA; Regan Bergmark, MD, Boston, MA; Ahmad R. Sedaghat, MD PhD, Boston, MA; Stacey T. Gray, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to gain insight into current opioid prescribing patterns for patients undergoing sinus surgery and understand patient requirements postoperatively.

Objectives: Opioid related deaths in the United States have increased 200% since 2000 in part due to prescription diversion via patients who undergo surgery. The purpose of this study was to reconcile prescribing patterns with patient reported opioid use after endoscopic sinus surgery (ESS). **Study Design:** Retrospective chart review. **Methods:** Patients who underwent ESS between May 2017 and May 2018 were included. Opioid prescription, operative details, and postoperative opioid use data were extracted. The Massachusetts Prescription Awareness Tool (MassPAT) was queried to determine if patients filled their prescription. **Results:** 155 patients were included. Nearly all patients were prescribed an opioid

(94.8%). An average of 15.6 tablets was prescribed per patient. Among 116 patients with MassPAT data, 91.4% filled their prescription. Among 73 patients who reported how many tablets they used at the time of first followup appointment, 71.2% reported taking no opioids. Mean tablets prescribed were significantly greater among patients who underwent primary vs. revision surgery (16.5 vs 13.5, p=0.0111) and those who had splints placed (21.5 vs 15.1, p=0.0037). Predictors of opioid use included concurrent turbinate reduction (58.3% vs 14.3%, p<0.0001) and concurrent septoplasty (45.5% vs. 21.6%, p=0.039). **Conclusions:** Nearly all patients who underwent ESS were prescribed an opioid and nearly all patients filled their prescription. However, the vast majority of patients did not require any opioid postoperatively. Provider prescribing patterns and patient assessment of pain appear to be starkly opposed, indicating a need for urgent change in provider behaviors to mitigate the current opioid epidemic.

3:58 **Long Term Outcomes after Endoscopic Dacryocystorhinostomy without Mucosal Flap Preservation**

Todd T. Kingdom, MD, Aurora, CO; Henry P. Barham, MD, Baton Rouge, LA; Vikram D. Durairaj, MD, Austin, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss long term outcomes of powered endoscopic DCR without the preservation of mucosal flaps for the management of acquired nasolacrimal duct obstruction.

Objectives: A growing body of evidence demonstrates that endonasal endoscopic dacryocystorhinostomy (DCR) techniques provide comparable results to conventional external techniques. The purpose of this study was to evaluate long term outcomes of powered endoscopic DCR without the preservation of mucosal flaps for the management of acquired nasolacrimal duct obstruction (NLDO) performed by a single surgical team. **Study Design:** A retrospective review was performed of patients with epiphora secondary to acquired nasolacrimal duct obstruction who underwent endoscopic DCR without mucosal flap preservation from May 2003 to April 2013 at a tertiary referral medical center. **Methods:** Main outcome measures were subjective improvement in epiphora and assessment of anatomic patency based on lacrimal irrigation and endoscopic evaluation. **Results:** 80 patients (69 primary and 11 revision) totaling 103 procedures (87 primary, 16 revision) were available at a mean followup of 28.7 (range 6 - 114) months. At the most recent followup, complete resolution of epiphora or mild intermittent postoperative epiphora was noted in 99% (102/103) of procedures; complete resolution was recorded in 89.3% (92/103) of procedures. Complete resolution of epiphora was noted in 93.1% (81/87) of primary eDCR procedures and 68.8% (11/16) of revision eDCR procedures. Objective anatomic patency confirmed in 98% (101/103). A revision procedure was required in 5.8% (6/103). **Conclusions:** Outcomes of powered endoscopic DCR without the preservation of mucosal flaps compare favorably to previously reported outcomes in both success rate and long term outcomes. These results suggest mucosal flap preservation may not be required to achieve successful outcomes.

4:05 **Symptom Profile of Chronic Rhinosinusitis versus Obstructive Sleep Apnea**

Keven Sy Ji, BA, Durham, NC; Lyndon Chan, MD, Durham, NC; Ralph Abi Hachem, MD, Durham, NC; David W.J. Jang, MD, Durham, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the symptom profiles of chronic rhinosinusitis vs. obstructive sleep apnea patients and identify which patients presenting with rhinologic symptoms should potentially undergo polysomnography.

Objectives: Patients with undiagnosed obstructive sleep apnea (OSA) will often present to an otolaryngologist with symptoms of chronic rhinosinusitis (CRS). This study analyzes symptom profiles of such patients to help identify which require polysomnography. **Study Design:** This is a three year retrospective analysis of adult patients seen in an academic practice with a rhinologic chief complaint. **Methods:** Results of the 22 item Sino-Nasal Outcomes Test (SNOT-22) survey were compared between patients with untreated OSA confirmed on polysomnography without CRS (OSA group) and a control group of CRS patients. Chi-square test with Bonferroni correction was used. **Results:** 43 patients were included in the OSA group [mean apnea hypopnea index: 29.3 (SD 20.7)] and 124 patients were included in the CRS group. Sleep and psychological domain scores were not significantly different between the two groups, although OSA patients were more likely to choose a sleep related symptom as their most important complaint (MIC) (p<0.001). As for the cardinal symptoms of CRS, nasal discharge and loss of smell were significantly higher in the CRS group (p<0.001), whereas facial pain and nasal obstruction were not significantly different (p=0.117 and p=0.198, respectively). Facial pain and nasal obstruction were the most common MICs in the rhinologic domain for OSA patients, whereas thick nasal discharge and postnasal discharge were the most common MICs for the CRS group. **Conclusions:** For patients presenting with rhinologic symptoms, the SNOT-22 can help identify those with undiagnosed OSA. OSA should be suspected in patients with sleep dysfunction as their primary complaint without the significant nasal drainage and anosmia that characterizes CRS.

4:12 **Medical Liability in Rhinology**
Suparna N. Shah, MD, Galveston, TX; Kareem B Haroun, MD, Galveston, TX; Mohamad R. Chaaban, MD, Galveston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the basis of malpractice litigation and the current trends in malpractice litigation in rhinology.

Objectives: To analyze medical litigation trends in sinus surgery from 2000-2017 in the United States. **Study Design:** Analysis of a national database of civil trials in the US. **Methods:** The Westlaw database was reviewed from 2000 to 2017. **Results:** Five hundred cases were reviewed with 75 meeting inclusion criteria. Most cases went to trial over settlement (80%). Most malpractice cases (36%) occurred in the northeast region of the United States. The most common legal allegations (74%) were improper performance and failure to follow standard of care. However, the highest payouts were for progression of disease and improper use of medication. Regarding damages, ocular injury was the highest (n=22, 29%) followed by intracranial injury (n=20, 27%). Of the 75 cases analyzed, 37 (49.3%) used expert witnesses. When expert witnesses were used, the verdict statistically favored the defendant (62.5%). The highest payout of $13M was in Indiana for progression of disease, which was a failure to diagnose cancer that ultimately led to the patient's death. **Conclusions:** Our analysis revealed a decrease in number of malpractice cases as well as award amounts related to sinus surgery after 2015. Malpractice cases were highest in the northeast United States. Despite ocular and intracranial injury being the most common damages reported, average awards were higher when cases involved malignancy, wrongful death or improper use of medication (injection as opposed to topical application). In addition to being cautious when performing sinus surgery, sinus surgeons should be aware of medications used during surgery to avoid inadvertent injections.

4:19 **Q&A**

4:25 - 5:10 **IS SINUS SURGERY GOING AWAY?**
Moderator: Todd T. Kingdom, MD FACS, Denver, CO
Panelists: **The Role of Biologics and Their Impact on the Need for Surgery**
Robert C. Kern, MD FACS, Chicago, IL
The Expanding Application of Office Based Procedures
Sandra Y. Lin, MD, Baltimore, MD
Surgical Management of Fungal Rhinosinusitis
Stilianos E. Kountakis, MD PhD FACS, Augusta, GA
Changing Selection Criteria for Surgery and Impact on Utilization
Adam M. Zanation, MD, Chapel Hill, NC

5:10 **Q&A**

5:15 ***ADJOURN SESSION***

5:30 - 7:00 ***VICE PRESIDENT'S WELCOME RECEPTION (for all attendees) - Sun Deck***

3:30 - 5:20 CONCURRENT SESSION 2B
LARYNGOLOGY/BRONCHOESOPHAGOLOGY - CAROUSEL ROOM

3:30 - 4:15 **REFLUX, IRRITABLE LARYNX, AND COUGH**
Moderator: Kenneth W. Altman, MD PhD FACS, Houston, TX
Panelists: **How Often and under What Circumstances Does Reflux Cause or Contribute to Laryngeal Irritability or Cough?**
Kenneth W. Altman, MD PhD FACS, Houston, TX
Defining Reflux (GER vs LPR), How Is It Diagnosed/Quantified, and What Are Our Limitations as Otolaryngologists Relative to the Cough Guidelines?
Jonathan M. Bock, MD, Milwaukee, WI
Is the Pathophysiology Different in Children?
Romaine F. Johnson, MD MPH, Dallas, TX
What Are the Manifestations and Mechanisms of Laryngeal Irritability to Include PVFM, Episodic Reflux Laryngospasm, Chronic Irritable Larynx, and Chronic Cough?
Natasha Mirza, MD FACS, Philadelphia, PA

4:15 **Q&A**

Moderator: Robert M. Kellman, MD FACS, Syracuse, NY

4:20 **2018 TRIOLOGICAL SOCIETY THESIS - HONORABLE MENTION FOR CLINICAL SCIENCE RESEARCH**
Oropharyngeal Symptoms Following Suspension Laryngoscopy: Procedural Factors and the Impact of Submucosal Perfusion Using Capillaroscopy
Paul C. Bryson, MD FACS, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the most common oropharyngeal side effects of suspension laryngoscopy as well as their risk factors. Participants will also gain understanding of capillaroscopy and the impact of sublingual microcirculation on the presentation of common oropharyngeal side effects after suspension laryngoscopy.

Objectives: The tongue and oropharyngeal soft tissues are compressed during suspension laryngoscopy (SL). Microvascular compression with decreased perfusion, neuronal injury or a combination of both is believed to be responsible for postoperative oropharyngeal symptoms. Despite the commonality of the procedure, the mechanism of oropharyngeal and neurogenic tongue symptoms is incompletely described and there are no real time measures of tissue compression or tongue perfusion. Surface capillaroscopy utilizes laser Doppler technology to visualize capillary morphology and blood flow. Sublingual capillaroscopy has never before been used to describe tongue and sublingual circulation during SL. The objective of the study are: 1) to describe the technique of surface capillaroscopy in the oral cavity during SL as a means of characterizing intraoperative microvascular blood flow in real time; 2) to describe microvascular perfusion changes of the tongue during suspension laryngology; 3) to assess and characterize the relationship of microvascular blood flow to oropharyngeal symptoms; 4) to report the overall oropharyngeal and neurogenic tongue symptom profile in suspension laryngoscopy; and 5) to determine if length of suspension, laryngoscope type and suspension apparatus, patient characteristics, or changes in mean vascular flow index correlates with postoperative symptoms. **Study Design:** Prospective cohort. Prospective, non-randomized, video analysis of microcirculation before, during, and after SL with patient reported assessment of oropharyngeal symptoms before and after SL. **Methods:** Adult patients undergoing SL for any reason were prospectively enrolled and organized based on demographics/characteristics, operative indication, operative time, scope and suspension type, and difficulty of laryngoscopic exposure. Three, 20 second video capillaroscopy recordings of sublingual microcirculation were obtained at time points starting prior to suspension, immediately after laryngoscope insertion and suspension, then at regular intervals throughout the procedure, and once again when the scope was removed. The microvascular flow index (MFI) and capillary morphology was determined for all time points by two blinded reviewers. An oropharyngeal symptom assessment questionnaire was completed by the patient pre-\operatively and then at two weeks and four weeks postoperatively. **Results:** Oropharyngeal symptoms were present in 33% of subjects 4 weeks following SL. Neurogenic tongue symptoms were present in 20%. Capillaroscopy was successfully performed on all subjects. Neurogenic tongue symptoms were associated with MFI reduction. Length of surgery was associated with persistent tongue numbness 4 weeks following SL. Type of scope and suspension were not statistically associated with oropharyngeal or neurogenic tongue symptoms. Difficult exposure was associated with persistent oropharyngeal symptoms and combined neurogenic tongue symptoms. In difficult exposures, there was increased risk of neurogenic tongue symptoms and a greater reduction in MFI. BMI greater than 28kg/m^2 increased the risk of neurogenic tongue symptoms. **Conclusions:** Surface capillaroscopy can be easily performed during SL. Reduced microvascular perfusion appears to play a role in neurogenic tongue symptoms following SL. Increased length of suspension, difficult laryngoscopic exposure, and elevated BMI increase the risk of these and other oropharyngeal symptoms. Surgeons should counsel patients accordingly and consider periodic relaxation from suspension in patients and procedures with these characteristics.

4:27 **Topical Anesthetic Techniques in Office Based Laryngeal Surgery: A Comparison of Patient Preferences**
Matthew R. Naunheim, MD MBA, New York, NY; Peak Woo, MD, New York, NY (Presenter)

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the differences in patient satisfaction between various topical anesthetic techniques for office based laryngeal procedures.

Objectives: Multiple topical anesthesia techniques exist for office based laryngeal surgery. Our objective was to assess patient and surgeon satisfaction for 3 different techniques. **Study Design:** Cohort study. **Methods:** All consecutive patients presenting to an outpatient laryngology practice for in-office surgical procedures were enrolled. Patients were anesthetized with local anesthesia (2cc of 4% lidocaine) in one of three ways: nebulizer, flexible cannula through a channeled laryngoscope, or transtracheal instillation. Demographics, procedure times, and surgeon satisfaction were recorded. A validated 11 item patient satisfaction questionnaire (Iowa Satisfaction with Anesthesia Survey) was administered after the procedure to calculate an overall satisfaction score (-3[worst] to 3[best]). Descriptive and correlative statistics were performed. **Results:** 100 consecutive patients were included (37 females, 73 males), with relatively equal numbers between groups (32 nebulizer, 35 cannula, 33 transtracheal). Seven procedures were aborted (4 nebulizer, 2

cannula, 1 transtracheal) due to movement, anxiety, or technical issues, and 3 patients did not adequately complete the survey. Of the 90 remaining patients, patient satisfaction was highest with the transtracheal technique (2.04) vs. cannula (1.46) or nebulizer (1.45), and this was statistically significant (p=0.0167). This difference was driven by decreased pain and nausea scores in the transtracheal group. Surgeon satisfaction was lower with nebulizer and higher with transtracheal injection (p=0.0081). There was a correlation between surgeon satisfaction and patient satisfaction (p<0.0001). **Conclusions:** Transtracheal instillation was favored by both patients and the surgeon. Choice of local anesthetic techniques may impact patient preferences and surgical success. This may serve as a basis for optimizing anesthetic care in office based laryngeal surgery.

4:34 **Office Based Corticosteroid Injections as Adjuvant Therapy for Subglottic Stenosis**

Debbie R. Pan, BA, Miami, FL; David E. Rosow, MD, Miami, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) recognize subglottic stenosis as a recurrent and potentially life threatening disorder in need of successful treatment strategies; 2) demonstrate an understanding for the surgical burden of subglottic stenosis; and 3) appreciate the efficacy of office based corticosteroid injections in preliminary reports to increase surgery free intervals for patients with subglottic stenosis.

Objectives: Subglottic stenosis (SGS) is a serious, potentially life threatening disorder that is difficult to treat due to significant recurrence rates. While conventional treatment of SGS relies heavily on serial endoscopic dilation procedures, this study aims to characterize the efficacy of incorporating subglottic corticosteroid injections in increasing surgery free intervals for a cohort of patients at a university based medical system. **Study Design:** Retrospective chart review. **Methods:** All SGS patients who underwent endoscopic dilation and at least one adjuvant office subglottic corticosteroid injection (OSCI) were reviewed. Patients were excluded if they had synchronous airway lesions or stenosis outside of the subglottis. Charts were reviewed for demographic and treatment specific data. The surgery free interval was calculated for patients both prior to the initiation of OSCI and after. Groups were compared via Mann-Whitney U test, with p<0.05 the threshold for significance. **Results:** 13 patients met criteria, with mean age 50.1±14.1 years and 7:6 female:male ratio. 8/13 (61.5%) had intubation related stenosis, while 4/13 were idiopathic and 1/13 was due to Wegener's granulomatosis. Patients underwent an average of 3.7±1.7 postoperative injections, beginning 45.9±19.0 days after surgery. The mean surgery free interval prior to initiating OSCI was 288.6±343.4 days, while after receiving OSCI, the mean interval was significantly longer (453.0±191.9 days, p=0.028). **Conclusions:** We demonstrate that utilizing office based corticosteroid injections for SGS caused statistically significant improvement in the surgery free interval and is a promising adjuvant approach. Future prospective studies should evaluate if the efficacy is reproducible on a large scale and if OSCIs can and/or should be incorporated into the standard management paradigm for SGS treatment.

4:41 **What a Pain in the Neck - Anterior Cervical Pain Syndrome Risk Factors, Variations in Hyolaryngeal Anatomy and Treatments**

Karuna Dewan, MD, Palo Alto, CA; Christine Yang, Palo Alto, CA; Mrudula Penta, MD, Palo Alto, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the causes of anterior neck pain/point tenderness. They should be able to explain the theories regarding causes of anterior cervical pain and abnormalities of the hyolaryngeal complex. Participants will be able to compare the treatment approaches for anterior cervical pain syndrome.

Objectives: Anterior cervical pain syndrome (ACPS) is a poorly understood condition including hyoid bone syndrome, thyroid cartilage syndrome, click larynx and superior thyroid cartilage cornu syndrome. All are associated with lateral neck pain/point tenderness. This investigation aims to describe patients with ACPS, hyolaryngeal complex anatomy, common presenting symptoms and successful treatments. **Study Design:** Retrospective chart review of all patients with ACPS presenting to a tertiary care laryngology practice in a one year period. **Methods:** All patients diagnosed with ACPS for one year were reviewed. Variables of interest included gender, age, BMI, duration of pain symptoms and previously tried therapies. Using CT scans of the neck each patient's hyolaryngeal complex was measured including hyoid length/angulation, superior laryngeal cornu length, and hyolaryngeal distance. Intervention and pain free duration were also recorded. **Results:** In one year 9 patients were diagnosed with ACPS. 67% were female with an average age of 47.3 ±16.6 years and average BMI of 24.8±3.69 kg/m2. 11% reported neck trauma. In addition to pain, patients reported dysphonia (55%) and dysphagia (44%). Triggers included talking (67%), head turning(56%), yawning (56%), swallowing (56%) and chewing (44%). 88% showed abnormalities of the hyolaryngeal complex on CT scan, with 100% correlation to point tenderness location. Treatment included therapy (22%), steroid injection (22%), lidocaine injection (11%) and surgical intervention (44%). **Conclusions:** ACPS is a complex pain condition often impacting young thin females. Evaluation should include imaging of the hyolaryngeal complex as anatomic variation can be cause of ACPS. Effective treatments include steroid injection and surgical resection of portions of the hyolaryngeal complex.

4:48 **Vice President's Resident Research Award - Western Section**
Long Term Alterations within Cortical Basal Ganglia Cerebellar Networks in Unilateral Vocal Fold Paralysis
Philip L. Perez, MD, San Francisco, CA; Kristine L. Cueva, BS, San Francisco, CA; Margaret L. Naunheim, MD, Seattle, WA; Leighton B. Hinkley, PhD, San Francisco, CA; Srikantan S. Nagarajan, PhD, San Francisco, CA; Steven W. Cheung, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe differences in cortical basal ganglia cerebellar functional connectivity between treated unilateral vocal fold paralysis (UVFP) and healthy control cohorts.

Objectives: To evaluate differences in cortical basal ganglia cerebellar functional connectivity between treated unilateral vocal fold paralysis (UVFP) and healthy control cohorts using resting state functional magnetic resonance imaging (RS-fMRI). **Study Design:** Cross-sectional. **Methods:** Nine UVFP study patients treated by medialization laryngoplasty (type I thyroplasty) at least 3 months prior to study participation and 13 control subjects underwent RS-fMRI on a 3T scanner (GE Healthcare) to compare functional connectivity networks. Spontaneous fMRI data (eyes closed) were collected using a gradient echo planar pulse sequence. RS-fMRI data were preprocessed and analyzed to compare seed to -voxel maps between cohorts (CONN toolbox - https://www.nitrc.org/projects/conn/). Group contrasts were statistically evaluated using unpaired t-tests corrected for multiple comparisons with a cluster false discovery rate threshold of $p<0.05$. **Results:** Compared to healthy controls, UVFP subjects demonstrated statistically significant increases in connectivity between both caudate nuclei and regions of the default mode network, including precuneus and medial prefrontal cortex. Furthermore, both caudate nuclei showed decreases in connectivity with the cerebellum. **Conclusions:** UVFP patients treated by medialization laryngoplasty exhibit long term alterations of cortical basal ganglia and basal ganglia cerebellar networks, circuits thought to be important for vocal motor control. These findings in treated UVFP add to growing evidence of persistent central nervous system plastic changes despite expert surgical intervention for a predominantly peripheral motor impairment of the larynx.

4:55 **Correlation of Salivary and Nasal Lavage Pepsin with MII-pH Testing**
Miles Jonathan Klimara, BA, Milwaukee, WI; Nikki Johnston, PhD, Milwaukee, WI; Tina L. Samuels, MS, Milwaukee, WI; Joel H. Blumin, MD, Milwaukee, WI; Jonathan M. Bock, MD, Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the correlation between MII-pH monitoring data and the presence of pepsin in salivary and nasal lavage specimens in the diagnosis of laryngopharyngeal reflux.

Objectives: Laryngopharyngeal reflux (LPR) is a common upper airway disease. Salivary pepsin is a proposed marker for LPR; however, the optimal time for collection of specimens for pepsin detection, and pepsin's presence in the oral and nasal secretions relative to concurrent multichannel intraluminal impedance pH (MII-pH) monitoring, is unknown. **Study Design:** Case control study comparing patients with suspected LPR and reflux free control subjects in an ambulatory setting. **Methods:** Patients undergoing MII-pH testing for evaluation of LPR and reflux free control subjects were selected. Nasal lavage and saliva samples were collected in clinic prior to MII-pH probe placement. Additional saliva samples were obtained an hour after each meal and upon waking the following morning. Nasal lavage and salivary pepsin were measured by ELISA. **Results:** 26 patients undergoing MII-pH testing and 13 reflux free control patients were enrolled. Salivary pepsin was detected in 9/26 patients with suspected LPR and 0/13 controls with an average concentration of 121.2 ng/ml. 8/9 patients with positive salivary pepsin had a positive specimen upon waking. A significant correlation was observed between salivary pepsin in waking samples to MII-pH measurements, including reflux bolus duration, and proximal and distal recumbent reflux episodes ($p<0.05$). A significant correlation was also observed between salivary pepsin upon waking or sinus lavage and RSI ($p<0.05$). **Conclusions:** Pepsin in salivary and nasal lavage samples demonstrated an association with MII-pH documented LPR. Pepsin detection was most frequent in morning samples, supporting use of morning salivary pepsin levels as a potential noninvasive technique for LPR diagnosis.

5:02 **Local Pepsin and Proton Pump Synthesis in Barrett's Esophagus May Promote Progression to Esophageal Adenocarcinoma**
Tina L. Samuels, MS, Milwaukee, WI; Kenneth W. Altman, MD PhD, Houston, TX; Jon C. Gould, MD, Milwaukee, WI; Tammy L. Kindel, MD PhD, Milwaukee, WI; Alexander C. MacKinnon, MD PhD, Milwaukee, WI; Nikki S. Johnston, PhD, Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants should be better aware of the contribution of refluxed and locally synthesized pepsin to esophageal adenocarcinoma.

Objectives: Gastroesophageal reflux disease and associated metaplasia of the esophagus (Barrett's esophagus, BE) are primary risk factors for esophageal adenocarcinoma (EAC). Widespread use of acid suppression medications has

failed to stem the rise of EAC, suggesting that nonacid reflux components may underlie EAC pathophysiology. Refluxed pepsin is a tumor promoter in the larynx; in vitro experiments suggest it has similar effects in the esophagus. Herein, specimens from the esophageal cancer spectrum were tested for pepsin presence and carcinogenic potential of pepsin assayed in an esophageal cell culture model. **Study Design:** Basic/translational. **Methods:** Pepsin was assayed in reflux and cancer free esophagi, BE, EAC, and esophageal cancer lacking association with reflux (squamous cell carcinoma; SCC). Refluxed or locally synthesized pepsin was assayed by Western blot. Local synthesis of pepsin and proton pumps was assayed via RT-PCR. The effect of pepsin on BE and EAC markers was investigated via ELISA and qPCR in human esophageal epithelial cells treated with pepsin or control diluent. **Results:** Pepsinogen and proton pump mRNA were observed in BE (3/5) and EAC (4/4), but not in normal adjacent specimens, SCC (0/2) or reflux and cancer free esophagi. Chronic pepsin treatment (0.1-1mg/ml, 4 weeks) of human esophageal cells in vitro induced BE and EAC markers interleukin 8 and KRT8 and depleted normal esophageal marker KRT10 ($p<0.05$) expression. **Conclusions:** Local synthesis of pepsin and proton pumps in BE and EAC is not uncommon. Their absence in nondysplastic esophagi and nonreflux attributed cancer, and carcinogenic changes elicited by pepsin in vitro support a role for pepsin in reflux attributed esophageal dysplasia.

5:09 **Q&A**

5:15 ***ADJOURN SESSION***

5:30 - 7:00 ***VICE PRESIDENT'S WELCOME RECEPTION (for all attendees) - Sun Deck***

7:00 - 7:50 **Business Meetings (Fellows Only)**
Southern Section - Continental
Western Section - Windsor

7:30 ***Attendee Breakfast with Exhibitors - Ballroom***

8:00 - 10:00 CONCURRENT SESSION 3A
FACIAL PLASTIC/RECONSTRUCTIVE SURGERY - CROWN ROOM

8:00 **Announcements - Peak Woo, MD FACS, Eastern Section Vice President**

Moderator: Lamont R.D. Jones, MD MBA, Detroit, MI

8:05 **Preoperative Characteristics of Over 1200 FSRP Patients**
Natalie S. Justicz, MD, Boston, MA; Shekhar K. Gadkaree, MD, Boston, MA; Robin W. Lindsay, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe characteristics of patients presenting preoperatively for functional septorhinoplasty (FSRP) associated with increased NOSE scores.

Objectives: To identify characteristics of patients presenting preoperatively for functional septorhinoplasty (FSRP) associated with increased NOSE scores. **Study Design:** Retrospective analysis of a prospective cohort at a tertiary medical center. **Methods:** 1264 patients completed baseline nasal evaluation. NOSE (Nasal Obstruction Symptom Evaluation) scores, demographics, surgical history, and physical exam findings were recorded. **Results:** The average preoperative NOSE score was 60 out of 100 (SD: 25). Fifty-three percent (639/1202) of respondents were female, though sex did not affect preoperative NOSE score (p=0.6). Patients under 18 had lower NOSE scores (P<0.001) though NOSE score at age 18-65 did not differ from age 65+ (p=0.83). Forty-eight percent (461/954) reported a history of nasal fracture, though fracture history did not affect NOSE score (p=0.21). Thirty-nine percent (378/958) reported prior nasal surgery. Rhinoplasty was not associated with a difference in preoperative NOSE score (p=0.21), however septoplasty (p<0.001), turbinoplasty (p<0.001), and sinus surgery (p<0.001) were all associated with an increased preoperative NOSE score. Snoring and OSA were also both associated with higher preoperative NOSE score (p<0.001). On exam, 989 (92%) of 1077 had narrowing of the left internal nasal valve at rest and 992 (92%) of 1082 had narrowing of the right, with moderate or severe narrowing or collapse associated with higher preoperative NOSE score (p<0.001). **Conclusions:** Patients presenting for operative intervention of NAO were evaluated. Sex was not associated with difference in NOSE score. History of septoplasty, turbinoplasty, and sinus surgery were associated with higher preoperative NOSE score, as was snoring/OSA and moderate/severe internal nasal valve narrowing or collapse.

8:12 **Keloid Link to Clinical Outcomes in Breast Cancer: A Potential Link between Ethnic Variations in Immune Response and Tumor Behavior**
Melissa B. Davis, PhD, Detroit, MI; Edward M. Walton, BS, Detroit, MI (Presenter); Brittany D. Jenkins, PhD, Athens, GA; Vanessa P. Chu, BA, Detroit, MI; Haythem Y. Ali, MD, Detroit, MI; Christine M. Nesland-Dudas, PhD, Detroit, MI; Lamont R. Jones, MD MBA, Detroit, MI

Educational Objective: At the conclusion of this activity, the participant should be able to 1) discuss the link between keloids and breast cancer; and 2) discuss the role of the immune system to explain ethnic variations in tumor development.

Objectives: It is known that keloids and breast cancer (BC) disproportionately affect African Americans (AA). The former is a benign fibroproliferative tumor characterized by malignant-like features but does not cross the threshold to malignancy. The latter is an often aggressive cancer with poor survival in AAs due to the predominance of triple negative and inflammatory subtypes. These disparities may be explained in part by ethnic variations in immune response. We hypothesized that there is a link between the development of keloids and differential outcomes in BC between AA and European Americans (EA). **Study Design:** Retrospective cohort study. **Methods:** Medical record review of 13,000 diagnosed cases of BC between 2005-2015 was conducted. Of these, 247 cases were screened keloid negative, 124 cases were keloid positive. Using this 371 patient cohort we conducted multivariate screening to identify epidemiological associations between BC related clinical factors and keloid status. Analysis was done using SAS derived software, JMP v13.0. **Results:** We found a race specific age association with AA patients displaying significantly younger ages

at diagnosis in keloid positive patients (mean, 52y) compared to keloid negative patients (mean, 57y) (p = 0.029), while EA patients had no difference in age (mean, 57y vs. 60y) (p = 0.149). We also observed a significant difference in tumor staging (p=0.0025). **Conclusions:** We found that keloid status of an individual may be indicative of a risk to be diagnosed with early onset, late staged BC. We found that keloid status was a distinguishing factor among AA women, which may point to a pathological/molecular pathway which predicates their unique cancer risk.

8:19 **Pediatric Midface Fractures: Outcomes and Complications**

Richard Kao, MD, Indianapolis, IN; Vincent J. Campiti, BS, Indianapolis, IN; Cyrus C. Rabbani, MD, Indianapolis, IN; Jon Y. Ting, MD, Indianapolis, IN; Michael W. Sim, MD, Indianapolis, IN; Taha Z. Shipchandler, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to characterize the patterns and frequencies of pediatric midface fractures, discuss management options and outcomes, and to better explain to patients the potential sequela of pediatric midface fracture management.

Objectives: Determine the etiology, management, followup, outcomes, and complication rates of pediatric midface fractures at a level one pediatric trauma center. **Study Design:** Retrospective case series. **Methods:** Included subjects with fractures of the zygoma, maxilla, ethmoid, sphenoid, nasal, naso-orbital-ethmoid, orbit, palate, Le Fort, lacrimal, and frontal sinus fractures. All imaging was reviewed. Statistical analysis was performed using chi-squared tests. **Results:** A total of 218 pediatric patients presented with midface fractures between 2012 and 2016. The most common etiologies of these patients' midface fractures included MVC (n=56, 25.7%), sport related (n=35, 16.1%), assault/battery (n=32, 14.7%), and falls (n=22, 10.1%). The distribution of 513 midface fractures in our population included: 124 maxillary fractures, 109 nasal, 105 orbital, 47 ethmoid, 40 sphenoid fractures, 33 zygoma, 28 frontal sinus, 21 lacrimal fractures, and 6 palatal fractures. There were 17 NOE, 2 Le Fort I, 9 Le Fort II, and 1 Le Fort III fractures. Overall, 59 patients (27.1%) received at least one type of midface related operative intervention during the initial encounter. The other 159 patients were treated conservatively. Only 135 patients (61.9%) followed up in clinic, thus the known complication rate was 14.2% (n=31) for the total subject population. Of patients with initial operations, 35.6% (n=21) experienced complications and 20.3% (n=12) required additional or revision surgeries. Of patients initially treated conservatively, 6.3% (n=10) experienced complications and 1.9% (n=3) eventually required surgery. Complications included facial deformity (n=30), diplopia (n=4), hardware related pain (n=3), paresthesias (n=3), and sinusitis (n=2). Rates of operative intervention for specific midface fracture subsites did not produce any statistically significant differences [X2=7.500, p=0.277]. Similarly, rates of complications for these midface fracture subsites were not significantly different [X2=4.551, p=0.337]. Complications were most commonly found in orbit, nasal bone, maxilla, and frontal sinus fractures. **Conclusions:** The most common sites of pediatric midface fractures involved the orbit, maxilla, and nasal bones. Nearly three quarters of pediatric midface fractures were treated conservatively with low rates of complication and revision surgery. Facial deformity was the most common complication of pediatric midface fractures found in this study. As such, proper management and followup are important to ensure normal growth and development of the pediatric facial skeleton.

8:26 **Incidence of Inadequate Perforators and Salvage Options for Anterior Lateral Thigh (ALT) Flaps: A Multi-Institutional Retrospective Review of over 1000 Flaps**

Haley E. Calcagno, MS, Portland, OR; William W. Thomas, MD, Portland, OR (Presenter); Brett A. Miles, DDS MD, New York, NY; Steven B. Cannady, MD, Philadelphia, PA; Matthew M. Hanasono, MD, Houston, TX; Mark K. Wax, MD, Portland, Oregon

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the frequency of nonviable ALT flaps and alternatives for reconstruction.

Objectives: Describe the incidence of nonviable ALT flaps and present options for salvaging the reconstructive procedure while minimizing patient morbidity. **Study Design:** Multi-center retrospective review. **Methods:** Retrospective chart review of 1166 ALT flaps wherein iatrogenic perforator injury was excluded from inclusion as a failed flap. **Results:** Twenty-seven flaps (2.3%) were discarded for nonviable skin paddle or lack of cutaneous perforators. In 10 cases, no perforators were noted following the anterior incision. Seventeen ALT flaps were discarded before pedicle ligation because of inadequate blood flow through an inadequate perforator. The reconstruction was salvaged by 7 radial forearm, 6 anteromedial thigh (AMT), 2 tensor fascia lata (TFL), 2 rectus femoris (RF), 2 pectoralis major, 5 contralateral ALT, 2 vastus lateralis (VL), 1 cervicofacial rotational, 1 fibula, 1 profunda artery perforator (PAP) and 1 vertical rectus myocutaneous (VRAM) flaps. Of the 27 cases, 12 salvage cases did not involve an additional wound for the patient as the same ALT site was utilized to harvest AMT, free vastus, RF and TFL flaps. Two patients had 2 free flaps placed at the revision. Two patients had no viable ALT flaps on bilateral lower extremities. **Conclusions:** The ALT flap is a reliable soft tissue flap capable of reconstructing multiple defects. Rarely cutaneous perforators are not present and multiple options exist to salvage the reconstruction without significant additional morbidity to the patient.

8:33 **The Spectrum of Facial Palsy: The Facial Palsy Photo and Video Standard Set**

Jacqueline J. Greene, MD, Boston, MA; Joana Tavares, MD, Boston, MA; Diego Guarin, PhD, Boston, MA; Olivia Quatela, BA, Boston, MA; Nate Jowett, MD, Boston, MA; Tessa Hadlock, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand and distinguish the complete spectrum of facial palsy and visualize a possible threshold severity of facial palsy beyond which joy is not perceived during smiling.

Objectives: Facial palsy causes variable facial disfigurement, from subtle asymmetry to crippling deformity. There is no existing standard dataset to serve as a resource for facial palsy education and research. Herein, we present a prospectively gathered, standardized set of facial photographs and videographs, representing the entire spectrum of flaccid and aberrantly regenerated facial palsy. Additionally, we established the relationship between level of facial function and emotion expression as determined by a machine learning based application that assesses perceived emotion. **Study Design:** Prospectively gathered case series. **Methods:** We prospectively gathered facial palsy photographs and videographs from patients without prior facial surgery or scarring, willing to have their data used in an open source database. Cases from both flaccid and synkinetic states were included to provide a resource for education and research. Patients were enrolled sequentially until each decile of eFACE score in each state (flaccid or aberrantly regenerated) contained five patients. The degree of palsy was quantified using eFACE, House-Brackmann, and Sunnybrook scales, and a QOL instrument (FaCE). Emotion scores were determined using emotion determining software (Affectiva, Inc, Boston MA), and compared across groups. **Results:** 60 patients were enrolled, to thoroughly populate the dataset across the range of facial function. Declining facial function correlated with loss of joy perception and increase in negative emotion perception. **Conclusions:** We provide an open source database representing the entire spectrum of facial palsy, which will assist in facial palsy comparative research, and suggest a threshold severity of facial palsy beyond which joy is not perceived during smiling.

8:40 **Postoperative Pain Is Mild and Opioid Need Is Minimal after Rhinoplasty**

Anthony P. Sclafani, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the level of pain and the need for and amount of postoperative opioid prescription after rhinoplasty.

Objectives: To assess the level and temporal course of pain as well as to assess the amount of opioid used by the average patient after cosmetic and/or functional rhinoplasty. **Study Design:** Prospective, observational case series. **Methods:** Patients undergoing elective functional and/or cosmetic rhinoplasty were prospectively enrolled between December 2017 and September 2018. Patients completed demographic and psychological (anxiety and depression and pain catastrophizing) screening tests and provided with pain assessment questionnaires before surgery. After surgery by a single surgeon, patients received 12 doses of opioid medication (oxycodone/acetaminophen, 5/325mg, 7.5 morphine milligram equivalents) for postoperative pain. Patients documented peak pain levels on a visual analogue scale, as well as daily narcotic and nonnarcotic medication use for the first 14 days after surgery. **Results:** Twenty-five patients were enrolled, and 20 patients completed all forms and were included for review. Patients reported no worse than mild pain after functional and cosmetic rhinoplasty. Maximum pain recorded by patients was 39/100 on the VAS scale, and maximum pain occurred on postoperative day #1. No patient used more than 6 doses of the prescribed opioid, and the majority had at least 8 doses remaining. **Conclusions:** Pain after cosmetic or functional rhinoplasty is mild and requires limited amount of postoperative opioids for adequate pain control. While patient comfort after rhinoplasty is a key component of postoperative management, opioid requirements are limited and prolonged pain is uncommon. Surgeons can limit the prescription of postoperative opioids.

8:47 **Radial Forearm Reconstruction of Oral Cavity and Oropharyngeal Defects without Tracheotomy**

Tara J. Wu, MD, Los Angeles, CA; Karam W. Badran, MD, Los Angeles, CA; Satvir Saggi, BS, Los Angeles, CA; Albert Y. Han, MD PhD, Los Angeles, CA; Jordan P. Sand, MD, Spokane, WA; Keith E. Blackwell, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) identify the utility of tracheotomy tube placement following radial forearm free flap (RFFF) reconstruction of glossectomy defects; and 2) describe the patient specific and perioperative comorbidities that may be associated with respiratory events following RFFF.

Objectives: To describe our experience of radial forearm free flap (RFFF) reconstruction of glossectomy defects with and without tracheotomy tube (TT) placement. **Study Design:** Retrospective review of consecutive patients treated at an academic institution. **Methods:** Ninety-two patients underwent RFFF oral tongue reconstruction between 2015 to 2018. Pre and intraoperative factors associated with respiratory compromise were documented. Postoperative respiratory complications were defined as inability to extubate, need for reintubation, TT placement, or pneumonia within 30 days

after surgery. Statistical analyses compared respiratory complications between those who underwent simultaneous TT placement and those who did not. **Results:** Eighteen patients underwent RFFF reconstruction without TT placement. The average hospital length of stay was 2.6 days longer in the TT placement group (p<0.01). One patient underwent a 30 day postoperative respiratory complication (p=0.31). There were no respiratory complications among those who did not undergo TT placement. Following multivariate analysis, large tongue base defect (>25% resection, p=0.03) and bilateral neck dissection (p=0.04) were significantly associated with TT placement. A history of chronic obstructive pulmonary disease (p=0.07), preoperative dysphagia (p=0.08), and hypoglossal nerve sacrifice (p=0.07) approximated but did not reach significance. A history of obstructive sleep apnea, asthma, smoking, and prior treatment with radiation were not significantly associated with TT placement or respiratory complications. **Conclusions:** RFFF reconstruction of glossectomy defects is feasible without TT placement in a subset of carefully selected patients without large tongue base defects (>25% resection) or bilateral neck dissection.

8:54 **"July Effect" in Otolaryngology Microvascular Reconstruction: Analysis of the American College of Surgeons National Surgical Quality Improvement Program Database**
Amishav Y. Bresler, MD, Newark, NJ; Richard Bavier, BA, Newark, NJ; Richard Chan Woo Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able discuss the impact of the "July effect" on otolaryngology microvascular reconstruction outcomes.

Objectives: To evaluate the July effect as possible risk factor for surgical complications in otolaryngology microvascular reconstruction due to the transitional period in academic calendar. **Study Design:** Retrospective database study. **Methods:** Otolaryngology microvascular reconstruction outcomes in the NSQIP (2005 - 2015) database were compared between the first academic quarter (July - September) to the last academic quarter (April - June). The primary outcome was 30 day mortality with secondary outcomes included 30 day morbidity, operative complications or postoperative adverse events. **Results:** 612 and 580 patients underwent otolaryngology microvascular reconstruction during the first and last academic quarters respectively. There was no significant difference between the 30 day mortality between the first academic quarter (1.5%) and the last academic quarter (0.7% p = 0.194). There was no difference in 30 day morbidity (47.9% vs. 49.5%, p = 0.586), operative complications (graft failure p = 0.762 , wound disruption p = 0.151, bleeding p = 0.526, operative time p = 0.162) or postoperative adverse events (deep vein thrombosis p = 0.460, pneumonia p = 0.737, reintubation p = 0.201, pulmonary embolism p = 0.452, ventilation for greater than 48 hours p = 0.769 , acute renal failure p = 0.500, urinary tract infection p = 0.693, unplanned readmission p = 0.202, and length of stay p = 0.026). **Conclusions:** There appears to be no July effect in otolaryngology microvascular reconstruction. Further studies should identify the mechanisms that preserve the safety of this operation year round for application to other surgical disciplines who have observed the July effect.

9:01 **Q&A**

9:05 **WESTERN SECTION GUEST OF HONOR INVITED PRESENTATION**
How Tension Might Prolong Your Longevity - Advances in Nasal Surgery
Richard E. Davis, MD FACS, Miramar, FL

9:30 - 10:00 **INNOVATION AND TRENDS IN AESTHETIC RHINOPLASTY**
Moderator: Brian J.F. Wong, MD PhD FACS, Irvine, CA
Panelists: Deborah Watson, MD FACS, San Diego, CA
Stephen S. Park, MD, Charlottesville, VA
J. Madison Clark II, MD FACS, Chapel Hill, NC
Richard E. Davis, MD, Miramar, FL

10:00 **Q&A**

10:05 - 10:30 ***Break with Exhibitors/View Posters - Ballroom***

8:00 - 10:00 CONCURRENT SESSION 3B
GENERAL/SLEEP MEDICINE - CAROUSEL ROOM

8:00 **Announcements - Pierre Lavertu, MD FACS, Middle Section Vice President**

8:05 - 8:55 **COMPLEX SLEEP PROCEDURES IN CHILDREN**
Moderator: Stacey L. Ishman, MD MPH, Cincinnati, OH
Panelists: Richard J. Schmidt, MD FACS, Wilmington, DE
Andrew R. Scott, MD FACS, Boston, MA

8:55 **Q&A**

Moderator: Robert H. Deeb, MD, Detroit, MI

9:00 **The Conception, Planning and Execution of a Successful Medical Service Trip to Developing Countries**
Larry A. Hoover, MD, Mission Hills, KS; Sreeya S. Yalamanchali, MD, Kansas City, MO; Ann B. Robinson, MD, Leawood, KS; Joseph L. Edmonds, MD, Houston, TX; Travis T. Tollefson, MD MPH, Sacramento, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to conceive, plan and execute a successful medical service trip to a developing country.

Objectives: To summarize the experiences of the authors and others in the execution of successful medical service trips. **Study Design:** Planning a successful medical service trip can be daunting. The authors have had a variety of experiences in a number of different countries that vary from our one resident author who has just completed her first medical research trip to the senior author who has completed over 50 service trips, most associated with host teaching institutions. Their experiences are summarized here. **Methods:** The most important factor for success is being prepared. Speaking with individuals who have been to the country or region one is considering is essential as local information is often unobtainable by other means. Be prepared to set up donated equipment yourself. Do not expect to find a high level of technical support in your host country. **Results:** During the course of the authors' combined experience, thorough planning has resulted in consistent achievement of set goals. Although all medical service trips have some commonality, language, cultural difference and geography all combine to make each situation unique. Gaining a grasp of these factors before one embarks can greatly enhance the chances for success. **Conclusions:** A successful medical service trip to developing countries can be one of the most gratifying experiences of one's medical career. Likewise embarking on such a project without proper planning and preparation can result in great disappointment for all involved. Following the guidelines in this presentation can be helpful in assuring the success, even of one's first medical service trip.

9:07 **The Utility of Smartphone Applications and Fitbit as a Screening Tool for the Diagnosis of Obstructive Sleep Apnea**
Sunny S. Kim, BA, Washington, DC; Daniel Chung, MD, Washington, DC; Richard L. Amdur, PhD, Washington, DC; Philip Zapanta, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of Fitbit and smart phone applications in the diagnosis of obstructive sleep apnea.

Objectives: The gold standard for diagnosis of obstructive sleep apnea (OSA) is the polysomnogram (PSG), which is an overnight study in a laboratory setting. The PSG, however, has cost and time limitations that may decrease its accessibility for the patients. The purpose of this study is to determine the efficacy and accuracy of Fitbit Alta HR and two sleep applications, compared to the PSG, to assess their possible uses as screening tools for OSA. **Study Design:** A prospective study was performed with patients who were already scheduled to undergo a PSG with or without CPAP testing from the sleep lab. The overnight test was performed with a Fitbit Alta HR on their wrist of choice and a smart phone at their bedside. Each smart phone had a popular sleep application installed, with Sleep as Android on the Android phone and Sleep Cycle on the Apple iPhone. **Methods:** Total of 185 patients participated in the study by wearing a Fitbit Alta HR during their sleep study, and were randomly assigned to the Android phone or the Apple iPhone. The total sleep time (TST), sleep efficiency, and apnea hypopnea index (AHI) were collected from the PSG and compared to their equivalents from Fitbit and smart phone applications. Statistical analysis was done with Bland-Altman plots, paired t-tests, and regression lines to assess R2, slope, and y-intercept. **Results:** Both Fitbit Alta ($p=0.0014$) and smart phone applications ($p<0.0001$) significantly overestimated the TST compared to PSG, with no systematic bias shown from the Bland-Altman plots. There was moderate correlation for sleep efficiency between PSG and Fitbit ($r=0.38$). The number of times awake by Fitbit significantly underestimated the PSG apnea hypopnea index (AHI) ($p<0.0001$). The snoring noise measurements from Sleep as Android had strong associations with PSG AHI ($R2 = 0.43$) and those from Sleep Cycle had modest associations with PSG AHI ($R2 = 0.12$). However, Bland-Altman plots showed that as sleep efficiency approached 100% and AHI measurements approached 0, the discrepancy between PSG, Fitbit, and applications decreased. **Conclusions:** Fitbits and smart phone applications universally overestimated sleep time, and there was only moderate association between sleep efficiency and AHI measurements. Qualitative analysis showed that the measurements were more accurate for patients without obstructive sleep apnea symptoms. In conclusion, raw data from the Fitbit and sleep applications should not be

recommended as screening tools for OSA.

9:14 **Statin Use Protective for Chronic Sinusitis in U.S. Outpatient Population**

James H. Wilson, Mchem, Charlottesville, VA; Spencer C. Payne, MD, Charlottesville, VA; Cyrelle-Elize R. Fermin, BS, Charlottesville, VA; Ian T. Churnin, MD, Charlottesville, VA; Jamiluddin Qazi, BS, Charlottesville, VA; Jose L. Mattos, MD MPH, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the potential therapeutic value of statins in treating chronic sinusitis.

Objectives: Statins have long been used in the management of cardiovascular disease for their lipid lowering properties. However, recent research suggests that statins may also have anti-inflammatory effects via modulation of lipid containing enzymes and mediators, and therefore may have therapeutic value in the treatment of chronic sinusitis. **Study Design:** Multivariate logistic regression of survey data. **Methods:** The 2006-2015 National Ambulatory Medical Care Survey (NAMCS) data was queried to analyze the relationship between statin use and rates of chronic sinusitis. Chronic sinusitis was indicated by the presence of an ICD 9 code for chronic sinusitis in one of the 5 diagnosis variables. Statin use was indicated by the presence of a statin medication in any of the 30 medication variables using the Multum Lexicon Drug Database, with newly prescribed medications excluded. Relevant demographic, socioeconomic, and comorbid factors were included in a multivariate logistic regression model which accounted for the complex, stratified, multi-stage survey design of NAMCS. **Results:** 390,538 visit records were used in the weighted analysis dataset. Statin use was associated with a decreased rate of chronic sinusitis in both a univariate analysis (OR = 0.53, $p<0.05$) and the multivariate logistic regression accounting for comorbid, socioeconomic, and demographic factors (OR = 0.79, $p<0.05$). **Conclusions:** Statin use is associated with decreased rates of chronic sinusitis based on a nationally representative sample of outpatient visits in the United States. This supports research which suggests statin medications may have protective properties against chronic sinusitis, and further research is warranted into their potential therapeutic value for this indication.

9:21 **Quality of Narrative Operative Reports in Endoscopic Sinus Surgery**

Shannon C. Wheeler, BS, Phoenix, AZ; Amar Miglani, MD, Phoenix, AZ; Nicholas L. Deep, MD, Phoenix, AZ; Devyani Lal, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the quality of narrative reports, particularly within endoscopic sinus surgery, and compare them to synoptic reports.

Objectives: The narrative operative report (NR) has been shown to omit critical elements of patient care. This may negatively impact consequent patient care and impact data analysis for quality control metrics. To the authors' knowledge, a study on the quality of NRs for endoscopic sinus surgery (ESS) has not yet been conducted. **Study Design:** Retrospective chart review. **Methods:** A list of 34 key critical variables, or quality indicators (QIs), that should ideally be included in a comprehensive NR report for ESS was predefined. Narrative reports for 90 patients who underwent ESS from 2014-2017 were reviewed for inclusion of QIs. NR efficiency was calculated by dividing the average percent of QIs dictated by the total word count. Subgroup analysis by the level of training (junior resident, senior resident, or attending physician) was also performed. **Results:** Preoperative information, intraoperative technical factors, and immediate postoperative findings were accurately documented in 85.5%, 83.7%, and 82.2% of patients, respectively. When comparing quality indicators between levels of training, attending physicians had the highest inclusion proportion (88.9% +/- 6.2%) followed by junior residents (86.5% +/- 5.7%) and then senior residents (79.7% +/- 13.9%). Attendings demonstrated the highest degree of NR efficiency (0.068). **Conclusions:** The dictated ESS report incompletely captures important clinical information. While some residents were better than others in QI reporting, their efficiency at dictation was lower than more experienced surgeons. A synoptic reporting system, which requires documentation of important indicators, may be beneficial in efficient and effective documentation.

9:28 **Can Movie Trailers Make You Deaf?**

Sujana S. Chandrasekhar, MD, New York, NY; Sajan N. Ramanathan, Glen Ridge, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the noise exposure experienced by moviegoers during previews/trailers, and discuss potential permanent cochlear damage that may be sustained.

Objectives: To identify and quantify potential hazardous noise exposure to the movie going public during the previews. **Study Design:** Decibel recordings from 50 movie previews and informational short movies were obtained and analyzed for volume and duration. **Methods:** Calibrated decibel meter recordings were made in both regular sound and IMAX® projection theaters prior to the main feature. The recordings were made from similar locations in the theaters. Data collected was analyzed and is presented in a descriptive manner. **Results:** Decibel presentations of trailers and shorts in IMAX® theaters ranged from an average of 91.3 dB to 102.1 dB, with a median of 95.5 dB. Maximal volume ranged from 99.1 dB to 111.3 dB. In regular sound theaters, average sound level ranged from 78.5 dB to 91.8 dB with a median

of 86.5 dB. Maximal volume ranged from 88.4 dB to 103.2 dB. All movies had approximately 15 minutes of previews. **Conclusions:** Currently accepted standards allow for 8 hours permissible time exposure at 85dB. For every 3 dBAs over that, allowed time is halved. Therefore, safe exposure time at 100 dB is 15 minutes and at 112 dB, 1 minute. Even before a movie begins, IMAX® audiences are subjected to 15 minutes of >90 dB noise. Other theater audiences are subjected to 15 minutes of often >86 dB, noise. With the current knowledge regarding noise related permanent cochlear synaptopathy, this appears to be a hidden source of noise trauma that can be easily addressed, if movie makers and theater owners are interested in protecting the public's hearing.

9:35 **A SIMPL Tool to Track Operative Autonomy in Otolaryngology Training**

Jenny X. Chen, MD, Boston, MA; Elliott D. Kozin, MD, Boston, MA; Jordan D. Bohnen, MD, Boston, MA; Brian C. George, MD, Ann Arbor, MI; Kevin S. Emerick, MD, Boston, MA; Stacey T. Gray, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how a novel smartphone application can be used to longitudinally track resident experiences and discuss how residents reach different levels of autonomy during training.

Objectives: In the era of the 80 hour work week, otolaryngology residents may not gain the operative experience necessary to function autonomously after graduation. This study quantifies residents' operative autonomy during training. **Study Design:** Survey and prospective study. **Methods:** Faculty and residents at a large academic institution were surveyed on the autonomy trainees should achieve for otolaryngology key indicator surgeries at each training level. Residents and faculty then used the mobile application System for Improving and Measuring Procedural Learning (SIMPL) to log trainees' operative autonomy on a validated four level Zwisch scale, from show and tell to supervision only. **Results:** Twenty residents and 17 attendings participated. The survey response rate was 87%. Residents over predicted the autonomy senior residents should attain for parotidectomy, rhinoplasty, thyroid/parathyroidectomy and airway procedures (all $p<0.05$) compared with faculty predictions. 833 total evaluations were logged on SIMPL between December 2017 and July 2018 of which 254 were paired evaluations for key indicator cases. Comparing survey and SIMPL data, residents and faculty over predicted the level of autonomy achieved by senior trainees performing mastoidectomy (PGY5, $p<0.05$), tympanoplasty (PGY5, $p<0.05$) and ethmoidectomy (PGY4-5, $p<0.05$); both felt that senior residents should operate with between passive help and supervision only whereas residents actually had passive help for these procedures. Residents similarly over predicted their autonomy during rhinoplasty ($p=0.017$) and parotidectomy ($p=0.007$) while attendings accurately predicted that chief residents would have passive help. **Conclusions:** SIMPL is a useful tool to longitudinally track surgical autonomy during training and can be used to help residents and attendings negotiate participation in the operating room.

9:42 **William W. Montgomery, MD Resident Research Award - Eastern Section**
Teaching Tracheotomy Management: The Creation of an Active Learning Workshop for Non-Otolaryngology Residents

Mingyang L. Gray, MD MPH, New York, NY; Scott A. Roof, MD, New York, NY; Mark S. Courey, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand basic educational theory to support active, collaborative, and problem based learning; and 2) explain the application of active, collaborative, and problem based learning to a workshop module on tracheotomy management for non-otolaryngology residents.

Objectives: Tracheotomy care and management is not a part of basic medical school education or residency training in many medical specialties. Therefore, the otolaryngology service is often consulted for the management of patients with tracheotomies. Opportunities for cross-disciplinary peer education among residents of different specialties exist to improve basic care of patients with tracheotomies. The purpose of this project is to develop an active collaborative problem based learning module for house staff and graduate learners to improve understanding and comfort in caring for patients with tracheotomies. **Study Design:** Literature review and teaching workshop design. **Methods:** A literature review of graduate and medical education teaching techniques using the AAMC MedEdPortal and PubMed was conducted. Using a model based on Bloom's Taxonomy with a focus on active, group based learning through problem solving and simulation, an hour long workshop for non-otolaryngology residents was created. The workshop included a brief 10 minute lecture, followed by three stations with hands-on experiences, and a summary of learning topics. Participants were asked to complete a pre-test and post-test to measure the effectiveness of promoting understanding and comfort in tracheotomy management. **Results:** Four sessions were conducted with a total of 85 participants. Participants' knowledge increased from 29% to 68% ($p<0.001$) and comfort level improved from 1.81 to 4.12 on the Likert scale ($p<0.001$). **Conclusions:** When active, collaborative, problem based learning programs are applied to cross-disciplinary resident education on tracheotomy care, both knowledge and comfort with tracheotomy care improved among non-otolaryngology residents.

9:49 **Implication of Fusobacterium Necrophorum and Streptococcal Species in Recurrent Peritonsillar Abscesses**
S. Ahmed A. Ali, MD, Ann Arbor, MI; Kevin J. Kovatch, MD, Ann Arbor, MI; Josh S. Smith, BS, Ann Arbor, MI; Paul T. Hoff, MD, Ann Arbor, MI; Carl M. Truesdale, MD, Ann Arbor, MI; John E. Hanks, MD, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to identify characteristics that are associated in patients at high risk for recurrent peritonsillar abscesses.

Objectives: To determine incidence of recurrent abscesses within the PTA population and characterize factors associated with higher risk of recurrence. **Study Design:** This is a single institution retrospective review of patients treated between 2000 and 2017. **Methods:** Univariate and multivariate survival analyses were performed, including epidemiologic, histologic, surgical/procedural outcomes, and long term followup data. **Results:** 156 of the 990 patients in our study developed recurrence of their abscess (16%). The age ranges most susceptible to recurrence included adolescent (22.9%) and young adult groups (17.1%). Recurrent patients were more likely to have experienced acute progression of symptoms (79% vs 71%, p = 0.03), trismus (67% vs 55%, p = 0.006), voice changes (65% vs 57%, p = 0.04) and dysphagia (72% vs 61%, p = 0.01) compared to nonrecurrent patients. They were also more likely to have clinical lymphadenopathy noted on initial examination (67% vs 56%, p = 0.009). Culture data was sent for 852 patients (86%). The presence of any streptococcal species (38% vs 22%, p < 0.0001) and the presence of fusobacterium necrophorum (67% vs 13%, p < 0.0001) were significantly more prevalent in the recurrent group. **Conclusions:** We describe increased prevalence of fusobacterium necrophorum and streptococcal species within PTA aspirates in the recurrent PTA population. It would thus be prudent for all practitioners to send aspirate for anaerobic growth to screen for FN. In addition, we would recommend close and dedicated followup with a low threshold to pursue tonsillectomy.

9:56 **Q&A**

10:05 - 10:30 ***Break with Exhibitors/View Posters - Ballroom***

10:30 - 12:30 CONCURRENT SESSION 4A
GENERAL AND RHINOLOGY/ALLERGY/SINUS - CROWN ROOM

10:30 - 11:20 **TOPICALS IN THE MANAGEMENT OF CRS**
Moderator: Stacey T. Gray, MD FACS, Boston, MA
Panelists: **Alternative Topicals**
Subinoy Das, MD FACS, Columbus, OH
Topical Steroids (and Different Types of Formulations Including Stents)
Peter H. Hwang, MD FACS, Stanford, CA
Topical Antibiotics and Antifungals
Alexander G. Chiu, MD, Kansas City, KS

11:20 **Q&A**

Moderator: Vishad Nabili, MD FACS, Los Angeles, CA

11:25 **Impact of Sinus Surgery on Hospital Utilization for Complications of Sinusitis**
Vivek C. Pandrangi, BA, Richmond, VA; Evan R. Reiter, MD FACS, Richmond, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the economic burden of sinus surgery on the treatment of sinusitis complications, compare differences between patients who require one versus revision sinus procedures, and discuss methods for reducing hospital utilization and improving access to early treatment.

Objectives: To assess the impact of sinus surgery on hospital utilization associated with treatment of sinusitis complications. **Study Design:** Retrospective analysis of a national hospital database. **Methods:** The National Inpatient Sample database for 2012-2013 was queried for patients with sinusitis and infectious complications. Patients were grouped based upon the presence of sinus procedures, and one versus repeat operations. Demographics, characteristics, length of stay (LOS), and costs were determined. **Results:** Out of 3,663 patients with sinusitis and associated complications, 538 (15%) underwent sinus procedures. One operation patients (n=490) had increased LOS from procedure to discharge compared to LOS of patients without sinus procedures (n=3,125) (5.8 ± 6.8 days vs. 4.6 ± 6.4 days; p<.001) and increased costs ($95,630 ± 204,902 vs. $33,307 ± 62,866; p<0.001). Increased time from admit to surgery in these patients was associ-

ated with discharge to another facility including skilled nursing facility (4.1 ± 4 days vs. 2.1 ± 4 days; p=.01), while reduced time was associated with routine discharge (2 ± 4 days vs. 3 ± 4.3 days; p=.02). Patients with revision sinus procedures (n=48) versus one operation had increased LOS (23.2 ± 24.3 days vs. 7.9 ± 8.3 days; p<0.001) and costs ($391,927 ± 620,814 vs. $95,630 ± 204,902; p<0.001), but no time difference from admit to first procedure (p=.25). Regression analysis found patients with sinus procedures had an excess LOS of 2.857 days and cost of $60,859. **Conclusions:** As prolonged time to sinus procedure and revision operations increase healthcare resources, improved access to early treatment may improve outcomes and reduce costs.

11:32 **Trend and Predictors of Surgery for Orbital Cellulitis: An Analysis of State Inpatient Database**

Pawina Jiramongkolchai, MD, St. Louis, MO; Dorina Kallgojeri, MD MPH, St. Louis, MO; Kim Jiramongkolchai, MD, Baltimore, MD; Jay F. Piccirillo, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to compare management of orbital cellulitis in pediatric versus adult patients and discuss longitudinal trends in surgical management.

Objectives: To evaluate the trend and predictors of surgical management of orbital cellulitis. **Study Design:** Retrospective cohort study using the State Inpatient Database from Florida and New York from 2005-2014. **Methods:** Patients with a diagnosis of orbital cellulitis (ICD9=376.01) who were treated in-state were identified. Surgery was defined as an ICD9 procedure code of orbitotomy, ethmoidectomy, and/or incision and drainage. Variables of interest included patient demographics, comorbidities, concomitant diagnoses at time of admission, hospital size and teaching status. **Results:** Of the 14,055 individuals with orbital cellulitis, 9,473 (67.4%) were adults and 4,582(32.6%) were children. 542 (11.8%) children and 1,223 (12.9%) adults received surgical management. From 2005-2013, the rate of surgery for children ranged from 10-19%. However, in 2014, the rate increased to 26%. Likewise, for adults, from 2005-2013, the rate of surgery ranged from 12-17%, and increased to 21% in 2014. In both children and adults, the following variables were significantly associated with surgery, respectively: male gender (aOR=1.5, 95% CI [1.2-1.8]; aOR=1.5, 95% CI [1.4-1.7]), treatment at a teaching hospital (aOR=1.98, 95% CI [1.5-2.5]; aOR=1.5, 95% CI [1.3-1.7]), facial cellulitis (aOR=2.2, 95% CI [1.7-2.9]; aOR=1.6, 95% CI [1.4-1.9]), acute sinusitis (aOR=5.5, 95% CI [4.5-6.7]; aOR=4.6, 95% CI [3.9-5.5]), diplopia (aOR=2.9, 95% CI [2.1-4.1]; aOR=2, 95% CI [1.3-3]), and exophthalmos (aOR=4.6, 95% CI [3.3-6.5]; aOR=3.6, 95% CI [2.8-4.5]). **Conclusions:** We identified an increased trend towards surgery as well as predictive characteristics of surgery for orbital cellulitis in children and adults. Future studies will incorporate the use of the State Ambulatory Surgery and Services Database to explore whether more patients are being medically managed as an outpatient, leading to an observed increased surgical trend among inpatients.

11:39 **Presentation and Outcomes of Noninvasive Sinusitis in Patients Following Liver and Kidney Transplantation**

Aviv Spillinger, BS, Rochester, MI; Christopher M. Low, MD, Rochester, MN; Janalee K. Stokken, MD, Rochester, MN; Erin K. O'Brien, MD, Rochester, MN; Garret W. Choby, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the clinical presentation and outcomes of noninvasive sinusitis following liver and kidney transplant and discuss the most efficacious management of this patient population.

Objectives: The purpose of this study is to fill a gap in the literature regarding the presenting symptoms and findings of patients with noninvasive rhinosinusitis following liver or kidney transplant and factors associated with sinusitis related complications, necessity of endoscopic sinus surgery (ESS) and disease resolution in this population. **Study Design:** Retrospective chart review. **Methods:** Liver and kidney transplant recipients evaluated by otolaryngologists for acute rhinosinusitis (ARS) or chronic rhinosinusitis (CRS) between 1998 and 2018 were identified. Univariate and multivariate logistic regression analysis was used to determine patient factors and treatment modalities associated with developing complications, need for ESS, and disease resolution. **Results:** 56 patients with CRS and 9 with ARS were identified. The average Lund-Mackay (LM) CT score was 10.8 and the median followup was 12 months. No patients developed intraorbital or intracranial complications of sinusitis in this cohort. For patients with CRS, univariate modeling demonstrated that the presence of polyps (p-value = 0.044) and higher LM score (p-value = 0.007) were associated with undergoing ESS within 1 year of presentation. Subsequent multivariate analysis identified only higher LM score (p-value = 0.025) as significantly associated with necessity of ESS. LM score, ESS, and level of immune suppression indicated by leukocyte and neutrophil count were not significantly associated with disease resolution. **Conclusions:** No patients in this study developed complications of their sinusitis despite being immunosuppressed due to transplant. A higher LM score on presenting CT scan is associated with an increased likelihood of undergoing subsequent ESS.

11:46 **Olfactory Outcomes after Endoscopic Skull Base Surgery: A Systematic Review and Meta-Analysis**

Linda X. Yin, MD, Rochester, MN; Christopher M. Low, MD, Rochester, MN; Cassandra L. Puccinelli, MD, Rochester, MN; Erin K. O'Brien, MD, Rochester, MN; Janalee K. Stokken, MD, Rochester, MN; Garret W. Choby, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to summarize previous publications comparing pre and postoperative olfactory outcomes after expanded endonasal skull base surgery.

Objectives: The goal of this study was to perform a systematic review and meta-analysis to determine olfactory outcomes of patients undergoing expanded endonasal approaches (EEA) to the skull base. **Study Design:** Systematic review and meta-analysis. **Methods:** An English language search was conducted using the Cochrane, Medline, Scopus, and EMBASE databases from 2000-October 2017 of adult patients undergoing EEA with standardized subjective and objective olfaction outcomes. Two authors independently examined the articles to identify those meeting inclusion criteria. A random effect meta-analysis was conducted to compare preoperative and postoperative olfactory outcomes using the University of Pennsylvania Smell Identification Test (UPSIT) and cross-cultural smell identification test (CCSIT) of patients undergoing sellar and parasellar EEA. **Results:** Among the 339 potentially eligible articles, 34 articles met inclusion criteria. 24 of these articles focused on sellar and parasellar tumors. Individual articles with olfactory outcomes not meeting criteria or inadequate sample size for meta-analysis were reviewed and qualitatively reported. Meta-analysis showed there was no difference in preoperative and postoperative olfactory function after endoscopic skull base surgery based on the UPSIT (5 studies, SMD=-0.54 [-1.34, 0.26], p= 0.19) and the CCIST (6 studies, SMD=-0.31 [-0.70, 0.07], p=0.11). However, heterogeneity for both meta-analyses was high (I2>90%, p<0.01), suggesting significant variation in the included studies. **Conclusions:** Based on the published objective olfaction outcomes after EEA, there is no significant difference between preoperative and postoperative olfactory testing. Further prospective studies using validated objective measures of olfaction are required to improve our understanding on this subject.

11:53 **Effects of Essential Oils to Inhibit Biofilm Formation by Gram Positive and Gram Negative Bacteria**

James C. Wang, MD PhD, Cincinnati, OH; Aneesh Bapodra, BS, Lubbock, TX; Jeremy Doan, Lubbock, TX; Joshua C. Demke, MD, Lubbock, TX; Phat Tran, PhD, Lubbock, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the antimicrobial effects of various types of essential oils. In addition, they should be able to explain how colony forming unit assays, zone of inhibitions assays, and confocal scanning laser microscopy can be utilized.

Objectives: Allergic bacterial rhinosinusitis is a problem that affects 30-60 million American adults and children. Bacteria often form biofilms on mucosal epithelium, which causes additional antibiotic resistance allowing them to persist as low grade infections with reduced immune clearance. Essential oils have shown promising results in in vitro and ex vivo studies with regards to their antimicrobial effects and immune modulation. This study examines the effects of essential oils to inhibit biofilm formation by gram positive and gram negative bacteria. **Study Design:** Basic sciences laboratory research. **Methods:** Pyrrla pure aromatherapy essential oils (orange, lemongrass, peppermint, lavender, eucalyptus, tea tree, clove leaf, cinnamon leaf, frankincense, and rosemary) were tested on staphylococcus aureus (Sa) green fluorescent protein (GFP) strain AH133 and Escherichia coli (Ec) GFP strain MM294. Zone of inhibition (ZI) and colony forming unit (CFU) assays were used to analyze the antimicrobial efficacy of the oils followed by the confocal laser scanning microscopy (CLSM). **Results:** Orange, lemongrass, peppermint, lavender, eucalyptus, tea tree, clove leaf, cinnamon leaf, frankincense, and rosemary essential oils were examined for inhibition of biofilm formation by Sa and Ec. The ZI ranged from 0-30 mm when tested on Sa. There was statistical significance (pd0.05) between control and all essential oils tested on Sa, except for frankincense and rosemary. For Ec, peppermint, tea tree, clove leaf, and cinnamon leaf revealed statistical significance compared to controls (pd0.05). These ZI and CFU assays were confirmed using CLSM. **Conclusions:** These preliminary studies suggest that essential oils are able to inhibit biofilm formation of both gram positive and gram negative organisms.

12:00 **Results of Routine Nasolacrimal Sac Histopathology Sampling during Endoscopic Dacryocystorhinostomy (DCR)**

Catherine G. Banks, MBChB, Boston, MA; Zoe H. Fullerton, Boston, MA; Qasim Husain, MD, Boston, MA; George A. Scangas, MD, Boston, MA; Ralph B. Metson, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand that endoscopic dacryocystorhinostomy (DCR) is most frequently performed for the diagnosis of idiopathic nasolacrimal duct obstruction. The purpose of this study was to determine the utility of routine biopsy of the nasal lacrimal sac performed at time of DCR to identify the cause of lacrimal obstruction to inform treatment decisions.

Objectives: Most patients who undergo endoscopic dacryocystorhinostomy (DCR) have a diagnosis of idiopathic naso-

lacrimal duct obstruction. The purpose of this study was to determine the utility of routine biopsy of the nasal lacrimal sac performed at time of DCR to identify the cause of lacrimal obstruction to inform treatment decisions. **Study Design:** Retrospective review. **Methods:** The histopathology of nasolacrimal specimens (n=693) obtained from 600 consecutive patients undergoing endoscopic DCR by a single surgeon over a 26 year period were reviewed. Specific focus included the identification of unanticipated pathologic findings, as well as pertinent patient demographics, radiologic findings, and intraoperative observations. **Results:** The study population was 66.4% female with an average age of 60.5 years (range 6 to 89 years). Pathological findings of tissue from the nasolacrimal sac, which was routinely sampled in all cases, included chronic inflammation (84.3%, n=584), normal histology (13.6%, n=94), neoplastic process (1.0%, n=7), and non-caseating granulomas (0.72%, n=5). Preoperative CT scan, patient history, or intraoperative findings alerted the surgeon to the possibility of a tumor in all but one of the patients found to have a neoplastic process as the cause of their lacrimal obstruction. **Conclusions:** This study highlights the low incidence of unanticipated neoplastic nasolacrimal sac biopsy results at time of endoscopic DCR. The various histopathologic findings in this large cohort demonstrate the importance of thorough preoperative examination in evaluation of the patient who presents with nasolacrimal duct obstruction.

12:07 **Morphologic, Intraoperative, and Histologic Risk Factors for Sinonasal Inverted Papilloma Recurrence**

Jake J. Lee, MD, St. Louis, MO; Jordan J. Licata, DO, Philadelphia, PA; Lauren T. Roland, MD, Atlanta, GA; Cristine N. Klatt-Cromwell, MD, St. Louis, MO; Rebecca D. Chernock, MD, St. Louis, MO; John S. Schneider, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the potential impact of histopathologic findings, such as grade of dysplasia and confirmed negative margins, and intraoperative findings, such as frontal sinus involvement, on the recurrence rate of sinonasal inverted papilloma.

Objectives: Sinonasal inverted papillomas (IP) are benign neoplasms with a propensity for local recurrence. Many risk factors are reported with little consistency between studies. This study aimed to comprehensively assess for demographic, imaging, histopathologic, and intraoperative risk factors for recurrence. **Study Design:** Retrospective case control study. **Methods:** Clinician notes, computed tomography images, pathology reports, and operative notes were reviewed for patients with pathologically diagnosed IP after undergoing surgical resection from 1997 through 2016. **Results:** Of 64 subjects, 34.4% (N=22) had recurrence. Median followup and time to recurrence were 43.4 (range 7.3-558.5) and 21.4 (range 4.3-158.8) months, respectively. Higher grade of dysplasia was significantly associated with recurrence (p=0.006). No confirmation of negative margins on histology (aOR 6.08, 95% CI 1.20-30.77) and frontal sinus involvement (aOR 6.08, 95% CI 1.21-30.44) were significantly associated with recurrence on multivariate analysis. Five patients (7.81%) had malignancy on initial pathology, none of whom recurred. Sex, smoking, cancer history, chronic rhinosinusitis, initial misdiagnosis, and prior surgery were not associated with recurrence. There were no significant differences in recurrence rates between Krouse and Cannady stages. On imaging, bony changes, skull base involvement, and skull base dehiscence were not associated with recurrence. Intraoperatively, gross complete resection, drilling of underlying bone, multi-sinus involvement, and skull base involvement were also not associated with recurrence. There were no differences in recurrence rates between endoscopic, open, and combined approaches. **Conclusions:** Sinonasal IP can recur many months postoperatively. Higher grade of dysplasia and frontal sinus involvement were significant risk factors for local recurrence while confirmed negative margins on histology were protective.

12:14 **National Patterns and Survival Impact of Treatment Delays in Surgically Managed Sinonasal Cancer**

Alexander N. Goel, BA, Los Angeles, CA; Jivianne T. Lee, MD, Los Angeles, CA; Marilene B. Wang, MD, Los Angeles, CA; Jeffrey D. Suh, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the patterns of treatment delays in the treatment of sinonasal cancer and the impact of prolonged treatment time on survival.

Objectives: To characterize treatment delays in sinonasal cancer treated with surgery and adjuvant radiation in a national sample, identify factors associated with delays, and determine the association of treatment delays with survival. **Study Design:** Retrospective cohort study. **Methods:** We included adults in the National Cancer database treated for sinonasal squamous cell carcinoma with definitive surgery followed by adjuvant radiation from 2004-2014. We examined surgery to radiation initiation, radiation duration, and surgery to radiation completion intervals as medians. We performed recursive partitioning analysis to identify thresholds for these treatment intervals that estimated the greatest differences in survival. We determined the association of treatment delay with overall survival using Cox proportional hazards regression. **Results:** Among 2,133 patients included, median durations of surgery to radiation initiation, duration of radiation, and surgery to radiation completion were 49, 46, and 98/days, respectively. The strongest predictor of delays was Medicare insurance (vs. private). We identified thresholds of 49, 59, and 100 days for surgery to radiation initiation, duration of radiation, and surgery to radiation completion, respectively, as estimating the largest survival differences. Delays in radiation duration (HR 1.28 [1.10-1.50]) and surgery to radiation completion (HR 1.18 [1.01-1.37]) beyond these thresholds independently predicted mortality after adjusting for confounders. Delays in surgery to radiation initiation were not significantly

associated with survival. **Conclusions:** Radiation duration and surgery to radiation completion intervals are associated with overall survival. Median durations may serve as national benchmarks. Treatment delays could be considered quality indicators for sinonasal cancer treated with surgery and adjuvant radiation.

12:21 **Q&A**

12:30 ***ADJOURN - afternoon activities are listed after Concurrent Session 4B***

10:30 - 12:30 CONCURRENT SESSION 4B LARYNGOLOGY/BRONCHOESOPHAGOLOGY AND PEDIATRIC OTOLARYNGOLOGY - CAROUSEL ROOM

Moderator: Udayan K. Shah, MD, Wilmington, DE

10:30 **2018 TRIOLOGICAL SOCIETY THESIS - HONORABLE MENTION FOR BASIC SCIENCE RESEARCH**
T-Helper 2 Lymphocyte Immunophenotype is Associated with Iatrogenic Laryngotracheal Stenosis
Alexander T. Hillel, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to understand Iatrogenic LTS as an immunologic event (not just fibrotic).

Objectives: This prospective controlled human and murine study assessed the presence of inflammatory cells and cytokines to test the hypothesis that immune cells are associated with fibroproliferation in iatrogenic laryngotracheal stenosis (iLTS). **Methods:** Inflammation was assessed by histology and immunofluorescence (IF), quantitative real time polymerase chain reaction (qRT-PCR), and flow cytometry of cricotracheal resections (CTR) of iLTS patients compared to normal controls. An iLTS murine model assessed the temporal relationship between inflammation and fibrosis. **Results:** iLTS specimens showed increased inflammation versus normal controls (159/hpf vs. 119/hpf, p=0.038), and increased CD3+ T-cells, CD4+ cells, and CD3+/CD4+ T-helper cells (all $p<0.05$). The inflammatory infiltrate was located immediately adjacent to the epithelial surface in the superficial aspect of the thickened lamina propria. Human flow cytometry and qRT-PCR showed a significant increase in Interleukin (IL)-4 gene expression, indicating a T_H2 phenotype. Murine IF revealed a dense CD4+ T-cell inflammatory infiltrate on day 4-7 post-injury, which preceded the development of fibrosis. Murine flow cytometry and qRT-PCR studies mirrored the human ones, with increased T-helper cells and IL-4 in iLTS versus normal controls. **Conclusions:** CD3/CD4+ T-helper lymphocytes and the proinflammatory cytokine IL-4 are associated with iLTS. The association of a T_H2 immunophenotype with iLTS is consistent with findings in other fibroinflammatory disorders. The murine results reveal that the inflammatory infiltrate precedes the development of fibrosis. However, human iLTS specimens with well-developed fibrosis also contain a marked chronic inflammatory infiltrate, suggesting that the continued release of IL-4 by T-helper lymphocytes may continue to propagate iLTS.

10:37 **Computational Fluid Dynamics in the Diagnosis and Management of Complete Tracheal Rings**
Eric C. Mason, MD, Columbus, OH; Maria B. Koenigs, MD, Columbus, OH; Kai Zhao, PhD, Columbus, OH; Tendy Chiang, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to understand how computational fluid dynamics modeling can be utilized to study airflow metrics and recognize changes before and after slide tracheoplasty for complete tracheal rings.

Objectives: Conventional techniques for the evaluation of complete tracheal rings incompletely define the airway and lack functional assessment. Computational fluid dynamics (CFD) is a computer engineering technique that provides physics based airflow models based on computed tomographic (CT) imaging. We quantified CFD metrics before and after slide tracheoplasty for the management of complete tracheal rings. **Study Design:** We performed CFD modeling on an infant with complete tracheal rings pre- and post-slide tracheoplasty and compared to age matched controls with normal airway anatomy. **Methods:** CFD models were constructed from two pre-treatment CTs and one CT following slide tracheoplasty as well as from six age matched controls with normal airway anatomy. CFD derived metrics such as wall shear stress and peak flow velocity were compared. **Results:** At six days old, the infant with complete tracheal rings had a peak flow velocity of 13.20-m/s and wall shear stress of 10.17-Pa. At five months, peak flow velocity increased to 25.20-m/s and wall shear stress to 11.38-Pa. After slide tracheoplasty at age nine months, peak flow velocity decreased to 9.88-m/s and wall shear stress to 6.92-Pa. There were also observable differences in our pre-treatment CFD models compared to age matched norms, which improved following surgery. **Conclusions:** CFD metrics of wall shear stress and peak flow velocity

are elevated compared to age matched norms in the presence of complete tracheal rings and return to normal values following slide tracheoplasty. CFD could be used to quantify disease severity, model surgical techniques, and assist with clinical decision making in the complex patient.

10:44 **Preoperative Communication Enhancement in Pediatric Tracheostomy: What Are We Missing?**

Rachel M. Santiago, MS CCC-SLP, Boston, MA; Reza Rahbar, DMD MD, Boston, MA (Presenter); Michelle Howard, MS CCC-SLP, Boston, MA; Natasha D. Dombrowski, BA, Boston, MA; Karen Watters, MB BCh, Boston, MA; John M. Costello, MA CCC-SLP, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe types of augmentative and alternative communication strategies to support the communication abilities of pediatric patients requiring tracheostomy; and 2) identify appropriate patients for referral to speech language pathologists for augmentative and alternative communication assessment.

Objectives: To analyze trends in augmentative communication tools and strategies used by pediatric patients referred to inpatient speech language pathologists prior to tracheostomy placement in acute care. **Study Design:** Retrospective review. **Methods:** Following IRB approval, a retrospective review was conducted for patients who underwent initial tracheostomy placement at our pediatric tertiary referral center and were concurrently referred to a specialized speech language pathologist prior to the date of the tracheostomy procedure to support communication abilities from 2013-2016. Patients were identified through data pull software by both surgical procedural and billing codes. Patients who underwent tracheostomy during a prior hospitalization or at an outside hospital were not included. Retrospective chart review and cross analysis of billing data for types of assessment and intervention procedures were conducted by two speech language pathologists for consensus agreement. **Results:** A total of 47 patients met inclusion criteria for analysis in this study. Ages ranged from 1 month 48 years old, with a mean age of 13.38 years. Average time between the bedside communication assessment and tracheostomy procedure date was 14.8 days. Baseline speech language disorders were identified in 11 patients (23.4%). Patients who were already nonspeaking at the time of consultation comprised 83% (n=39) of patients. Thirty-three patients (70%) utilized an electronic communication tool and 37 (79%) utilized low tech communication strategies during the preoperative period. A total of 33 patients (70%) were documented as using no tech or speech enhancement strategies during the acute hospitalization. **Conclusions:** Multidisciplinary tracheostomy teams should consider consultation to speech language pathologists for pediatric patients undergoing tracheostomy placement to assess for utility of high tech, low tech, and no tech augmentative and alternative communication strategies prior to the tracheostomy procedure.

10:51 **The Natural History of Silent Aspiration Seen on Modified Barium Swallow Studies in the Pediatric Population: A Retrospective Chart Review**

Joseph B. Meleca, MD, Cleveland, OH; Elizabeth O. Shay, BS, Cleveland, OH; Samantha Anne, MD, Cleveland, OH; Brandon Hopkins, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) demonstrate the natural history of silent aspiration in the pediatric population; 2) convey the importance of following up on patients with abnormal MBSS; and 3) brainstorm further studies to elicit the natural history of silent aspiration.

Objectives: 1) Demonstrate the natural history of silent aspiration in the pediatric population; 2) convey the importance of following up on patients with abnormal MBSS; and 3) brainstorm further studies to elicit the natural history of silent aspiration. **Study Design:** Retrospective chart review. **Methods:** Patients who underwent modified barium swallow studies (MBSS) from January 1, 2007, to December 31, 2017, were separated into two study arms: normal (N) and silent aspiration (SA). **Results:** A total of 62 patients were collected, with 31 in each group. The mean gestational age was 36.7 (N) and 36.2 (SA) weeks (p=0.68). The median age at first MBSS was 176 (N) and 178 (SA) days (p=0.13). The percentage of patients receiving a second MBSS was 29.0% (N) and 71.0% (SA) (p<0.0023), whilst 12.9% (N) and 45.2% (SA) received three or more MBSS (p<0.005). Speech therapy recommended diet modification in 12.9% (N) and 71.0% (SA) (p<0.0001). Only 9.6%, 25% and 42% of the SA group experienced resolution by age 1, 2 and 5 years old, respectively. There was no notable difference in comorbidities. **Conclusions:** There was no notable difference in gestational age, comorbidities or age at first MBSS. Only 9.6%, 25% and 42% of the SA group experienced resolution by age 1, 2 and 5 years old, respectively. A majority of silent aspirators do not resolve and need to be followed clinically with appropriate feeding recommendations.

10:58 **HPV RNA in Situ Hybridization as a Diagnostic Aid in Papillomatous Laryngeal Lesions**

Jordan A. Garcia, MD, Baltimore, MD; Lisa M. Rooper, MD, Baltimore, MD; Simon R. Best, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss 1) why distinguishing benign papillomatous lesions of the larynx from malignant lesions can be difficult using histology alone; and 2)

how RNA in situ hybridization can be a useful adjunct in distinguishing these lesions.

Objectives: Differentiating laryngeal squamous papillomas from papilloma with atypia or squamous cell carcinomas (SCC) has significant consequences for disease management and prognosis. However, overlapping clinical presentations and cytologic changes across the spectrum of papillomatous lesions can present diagnostic challenges for both otolaryngologists and pathologists. In this study, we examined the utility of RNA in situ hybridization (ISH) for low risk and high risk human papilloma virus (HPV) in classifying these lesions. **Study Design:** Retrospective tissue analysis. **Methods:** We constructed tissue microarrays using 55 squamous papillomas, 10 papillomas with atypia, and 18 papillary SCC identified at our hospital between 2000 and 2017. We performed RNA ISH for low risk and high risk HPV; slides were scored by an experienced head and neck pathologist. **Results:** Low risk HPV RNA ISH showed positive staining in 51/55 benign papilloma, 6/10 papilloma with atypia, and 0/18 papillary SCC. For high risk HPV RNA ISH, only 4/18 papillary SCC were positive among all samples. For distinguishing papilloma with atypia from papillary SCC, low risk HPV RNA ISH had a sensitivity of 60%, specificity of 100%, positive predictive value (PPV) of 100%, and negative predictive value (NPV) of 82%. For distinguishing papillary SCC from papilloma with atypia, high risk HPV RNA ISH had a sensitivity of 22%, specificity of 100%, PPV of 100%, and NPV of 42%. **Conclusions:** Low risk HPV RNA ISH is useful for distinguishing papilloma with atypia from papillary SCC while high risk HPV RNA ISH may have limited utility in this differential.

11:05 **James A. Harrill, MD Resident Research Award - Southern Section**
Tracheostomies among Extremely Preterm Infants in the United States - A Cross-Sectional Analysis
Cynthia S. Wang, MD, Dallas, TX; Yann-Fuu Kou, MD, Dallas, TX; Gopi B. Shah, MD, Dallas, TX; Ron B. Mitchell, MD, Dallas, TX; Romaine F. Johnson, MD MPH, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the increase in bronchopulmonary dysplasia in extremely premature neonates and the correlating increase in tracheostomies in this population.

Objectives: The occurrence of bronchopulmonary dysplasia (BPD) and invasive respiratory support is increasing among extremely premature neonates. Yet, it is unclear if there is a corresponding increase in tracheostomies among these patients. We hypothesize that in extremely premature neonates with BPD, the incidence of tracheostomy has also increased. **Study Design:** A cross-sectional study of US hospital discharges from 2006-2012. **Methods:** We analyzed the 2006 - 2012 Kids Inpatient Databases for hospital discharges of extremely premature neonates who underwent tracheostomy placement. We investigated whether tracheostomy placement is increasing among these infants, especially those with BPD. Additionally, we studied the outcomes of their hospitalization including the length of stay, tracheostomy related complications and death. Premature infants with gestational age > 28 weeks or birthweight > 1500 g served as the control group. **Results:** The study included 1,418,681 patients. 118,676(8.4%) were extremely premature neonates. 2029 tracheostomies were performed of which 803 (0.68%) were extremely premature neonates. The percentage of the study group who were extremely premature infants increased 17% between 2006 and 2012 with a corresponding 34% increase in tracheostomy placement. Tracheostomy related complication rates were similar in premature and extremely premature neonates (7.5% vs. 6.7%, p=.60). The mortality rate was higher in extremely premature neonates compared to controls with tracheostomies (18% vs. 14%, p = .05), but lower compared to extremely preterm infants without tracheostomies (18% vs. 23.7%, p = .002). **Conclusions:** Compared to premature infants, extremely premature infants experienced a marked increase in tracheostomies placed from 2006 to 2012. Those with tracheostomies experienced a decrease in in-hospital mortality.

11:12 **Outcomes of Surgical Treatment of Tracheal Stenosis**
Taylor W. Norton, MS, Memphis, TN; Madhu P. Mamidala, PhD, Memphis, TN; Marion B. Gillespie, MD MSc, Memphis, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to identify patients with laryngotracheal stenosis who are at risk for a poor outcome after surgical repair.

Objectives: To review a database of patients with laryngotracheal stenosis to determine the difference in outcomes between endoscopic and open management. **Study Design:** Retrospective review from a patient database from January 2017 through March 2018. **Methods:** A database of adult patients with laryngotracheal stenosis was compiled, and patient demographics, disease factors, comorbidities, and outcomes were recorded. Patients were stratified into open and endoscopic repair groups based upon the type of surgery performed. Group characteristics were compared to outcomes to identify factors associated with poor surgical outcomes. **Results:** A total of 61 patients were identified; 42 patients (69%) underwent endoscopic only surgery, and 19 (31%) received open repair. Of the 61 patients, 18 were male (30%) and 44 female (70%) with an average age of 52.7 years. Obesity was the most common comorbidity in the cohort at 70%. The open surgery cohort had higher stenosis grade on average (2.81) compared to the endoscopic only cohort (1.78) (p=0.0004), however there was no observed difference in the mean length of stenosis (2.75 cm v. 2.67 cm, respectively). Both open and endoscopic groups experienced improvement in perceived breathing (63% and 62%, respectively). Decannulation rates were higher for tracheotomized patients undergoing open repair (56%) compared to endoscopic

technique (8%) (p=0.007). However, the complication rate for open repair was higher than for endoscopic treatment alone (79% versus 17%; p=0.0001). **Conclusions:** In tracheotomized patients with few comorbidities, open repair may represent the best opportunity for decannulation. Notably, obese patients and current or former smokers should be managed endoscopically if possible, to minimize risk of complications.

11:19 **Effect of Unilateral Cordotomy on Perception of Dysphagia**
Melissa L. Conklin, BS, Aurora, CO; Matthew S. Clary, MD, Aurora, CO; Elizabeth M. Cuadrado, MS, Aurora, CO; Marie E. Jette, PhD, Aurora, CO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss changes in patient perception of dysphagia following cordotomy.

Objectives: CO2 laser medial transverse cordotomy is a permanent static procedure performed to achieve adequate functional airway in cases of posterior glottic stenosis and bilateral vocal fold paralysis. Although it is the preferred method to manage long term bilateral vocal fold immobility, it is widely believed that cordotomy has the potential to cause aspiration. The minimal existing data on the effect surgical enlargement of the glottic airway on swallowing function is heterogeneous. Through investigation of dysphagia after cordotomy, we hope to better understand the influence of glottic function and its role in dysphagia. The Eating Assessment Tool (EAT-10) is a validated dysphagia symptom specific outcome measure. We hypothesized that EAT-10 scores would not change after CO2 laser cordotomy despite causing glottic insufficiency. **Study Design:** Retrospective analysis. **Methods:** Retrospective review was performed on sequential patients having undergone unilateral CO2 laser cordotomy with complete pre and postoperative EAT-10, VHI-10, and Dyspnea Index questionnaire data available for evaluation. **Results:** Fifteen patients were available for analysis; 10 patients underwent de novo unilateral medial transverse cordotomy and 5 patients underwent revision cordotomy. The mean EAT-10 score during the visit prior to surgery was 6.0, whereas the post-surgery mean score was 4.36 points. Furthermore, this mean decrease of 1.64 points in EAT-10 scores after surgery was statistically nonsignificant (p=0.59). **Conclusions:** CO2 laser cordotomy does not cause patient reported dysphagia despite creating glottic incompetence. This suggests vocal fold apposition plays a less important role in normal swallowing function.

11:26 **Q&A**

11:30 - 12:25 **COMMON ERRORS IN DIAGNOSIS OF VOICE DISORDERS IN ADULTS AND CHILDREN**
Moderator: C. Gaelyn Garrett, MD MMHC, Nashville, TN
Panelists: Karen B. Zur, MD, Philadelphia, PA
Julina Ongkasuwan, MD, Houston, TX
Jenny Muckala, MA CCC-SLP, Nashville, TN
Paul C. Bryson, MD FACS, Cleveland, OH

12:25 **Q&A**

12:30 ***ADJOURN SESSIONS***

AFTERNOON & EVENING - LEISURE OR ACTIVITIES

12:30 ***GOLF OUTING (pre-registration required) - Coronado Course***

12:45 - 1:30 ***TRIOLOGICAL THESIS SEMINAR (pre-registration required) - Carousel Room***

12:45 - 2:00 ***RESIDENT BOWL (pre-registration required) - Crown Room***

12:45 - 2:45 ***PHYSICIAN/SCIENTIST MEETING (by invitation) - Windsor***

2:00 - 6:00 ***AMERICAN SOCIETY OF GERIATRIC OTOLARYNGOLOGY SCIENTIFIC SESSION (registration required with ASGO) - Carousel Room***

Friday

7:00 - 7:50 **Business Meetings (Fellows Only)**
Eastern Section - *Continental*
Middle Section - *Windsor*

7:30 ***Attendee Breakfast with Exhibitors - Ballroom***

7:55 - 9:45 GENERAL SESSION - CROWN ROOM

7:55 **Announcements - Brent A. Senior, MD FACS, Southern Section Vice President and Brian J.F. Wong, MD PhD FACS, Western Section Vice President**

Introduction of Vice Presidents-Elect by Section Vice Presidents
Gregory A. Grillone, MD FACS - Vice President-Elect, Eastern Section
Fred F. Telischi, MD FACS - Vice President-Elect, Southern Section
Albert L. Merati, MD FACS - Vice President-Elect, Western Section
Alan G. Micco, MD FACS - Vice President-Elect, Middle Section

8:05 - 9:25 **ANOTHER LOOK AT PHYSICIAN WELLNESS: PUT YOUR OWN OXYGEN MASK ON BEFORE HELPING OTHERS**
Moderator: Carol R. Bradford, MD FACS, Ann Arbor, MI
Panelists: **Creating a Wellness Initiative and Office**
Carol R. Bradford, MD FACS, Ann Arbor, MI
An Institutional Study of Wellness and ACS Wellness Resources
Michael S. Benninger, MD FACS, Cleveland, OH
The ACGME Back to Bedside Initiative
Jenna Devare, MD (Resident), Ann Arbor, MI
Perspectives on Resilience
Brian Nussenbaum, MD FACS, Houston, TX
From Burnout to Wellness: A Professional Imperative
Michael M. Johns III, MD, Los Angeles, CA

9:25 **Q&A**

9:30 - 10:00 ***Break with Exhibitors/View Posters -*** *Ballroom*

10:00 - 12:00 CONCURRENT SESSION 5A GENERAL AND HEAD & NECK - CROWN ROOM

10:00 - 11:00 **TREATMENT STRATEGIES FOR MALIGNANCIES OF HEAD AND NECK**
Moderator: Maie A. St. John, MD, Los Angeles, CA
Panelists: **Treatment of HPV+ Cancers; What We Have Learned and How to Inform Future Therapy and Trials**
Bruce H. Haughey, MBChB FACS, Celebration, FL
Opportunities for De-Escalation with Transoral Surgery for Cancer
Michael L. Hinni, MD FACS, Phoenix, AZ
Case Driven Updates Using AJCC Staging Criteria
Cherie-Ann Nathan, MD FACS, Shreveport, LA
Update: Young Tongue Cancer
Karen T. Pitman, MD FACS, Baltimore, MD
Reconstructive Strategies for Cancer Patients - Value Based Utilization of Technology
Rod Rezaee, MD, Cleveland, OH

11:00 **Q&A**

Moderator: Chad A. Zender, MD FACS, Cleveland, OH

11:05 **Prediction of Swallowing Function in TORS Patients Requiring Postoperative Adjuvant Treatment**

Opeoluwa O. Daniyan, MD, Miami, FL; Mario A. Landera, SLP-D, Miami, FL; Donna S. Lundy, PhD, Miami, FL; Carlos L. Green, MD, Miami, FL; Caitlin M. Coviello, BS, Miami, FL; Giovana R. Thomas, MD, Miami, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to compare short term swallowing outcome among three groups: TORS only, TORS plus radiotherapy, and TORS plus chemoradiotherapy and also compare short term swallowing function before and after completion of adjuvant treatment in a subset of patients. Participants will also learn how to use a newer scale of measuring oropharyngeal dysphagia called the DIGEST scale.

Objectives: Compare short term swallowing outcome among three groups: TORS only, TORS plus radiotherapy, and TORS plus chemoradiotherapy. In the subset of patients who underwent postoperative adjuvant treatment, we will compare short term swallowing function before and after completion of adjuvant treatment. **Study Design:** Retrospective chart review of TORS patients with oropharyngeal squamous cell carcinoma treated between September 2012 and November 2017 was performed. **Methods:** In this pilot study, we used the Functional Oral Intake Scale (FOIS) as well as a newer measure, the Dynamic Imaging Grade of Swallowing Toxicity (DIGEST) scale, to compare swallowing function in TORS patients both after surgery and after adjuvant therapy as indicated. Descriptive statistical analysis will be used to explore the data. **Results:** 39 patients were included in study. 89.7% were HPV positive. 19 patients underwent postoperative chemoradiation and 10 patients underwent postoperative radiation treatment. All patients fell under stage I or II disease. The clinically significant results of the FOIS and DIGEST scales demonstrated that the majority of patients were eating by mouth after completion of treatment and with the addition of chemotherapy, 10% more patients were tube dependent and 20% fewer patients were able to effectively protect their airway. **Conclusions:** There was no clinically significant difference in short term swallowing function between the patients who underwent TORS alone versus postoperative radiation treatment. Swallowing function did, however, worsen with the addition of chemotherapy. If our findings hold true after analyzing larger sample sizes, then patient selection and intense swallowing rehabilitation will become important to reduce swallowing dysfunction after treatment.

11:12 **Health Literacy: Impact on Quality of Life in Head and Neck Cancer Survivors**

Marci Lee Nilsen, PhD RN, Pittsburgh, PA; Lingyun Lyu, MS, Pittsburgh, PA; Shyamal Das Peddada, PhD, Pittsburgh, PA; Evan J. Randazza, BA, Pittsburgh, PA; Jonas T. Johnson, MD, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) identify the prevalence of health literacy in head and neck cancer survivors; and 2) discuss the impact of health literacy on quality of life.

Objectives: While inadequate health literacy has been shown to impact treatment compliance, hospitalization rates, and outcomes in other cancers, little is known about its impact in head and neck cancer (HNC). This study aimed to determine the prevalence and predictors of inadequate health literacy and evaluate the association between health literacy and quality of life (QOL) in HNC survivors. **Study Design:** A cross-sectional analysis of survivors who were treated for primary, locoregional squamous cell carcinoma and evaluated in a multidisciplinary HNC survivorship clinic. **Methods:** Health literacy was assessed via self report with the Brief Health Literacy Screen, with a score <10 indicating inadequate health literacy, and QOL was measured using the University of Washington QOL questionnaire. Linear regression with robust standard errors was utilized to evaluate the association between health literacy and QOL. **Results:** To date, 232 survivors have been evaluated; of which, 16% (n=36) had inadequate health literacy. Physical QOL score for survivors with adequate health literacy was estimated to be 10.04 points higher (p-value: 0.0059, 95% CI: (2.93, 17.15)) than those with inadequate health literacy, while adjusting for age, marital status, site, stage, and years since treatment. After accounting for covariates, social QOL score for survivors with adequate health literacy was estimated to be 10.62 points higher (p-value: 0.0014, 95% CI: (4.16, 17.08)) than those with inadequate health literacy. **Conclusions:** Inadequate health literacy is a predictor of lower physical and social QOL in HNC survivors, and among those with low health literacy, interventions to ameliorate the impact of HNC on these dimensions of QOL are needed.

11:19 **Impact of Opioid Dependence on Major Head and Neck Surgery**

Varesh R. Patel, BA, Newark, NJ; Sana H. Siddiqui, BA, Newark, NJ; Loka P. Thangamathesvaran, BA, Newark, NJ; Peter F. Svider, MD, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ; Wayne D. Hsueh, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate how opioid dependence impacts outcomes of head and neck surgery, with a particular focus on length of stay, cost and surgical complications.

Objectives: There is a growing opioid epidemic. This study aims to explore the association of opioid dependence with length of stay, cost and surgical complications of those undergoing major head and neck surgery. **Study Design:** Retrospective analysis utilizing the National Inpatient Sample (NIS) from 2002-2013. **Methods:** The NIS database was queried for head and neck procedures including mandibulectomies, glossectomies, esophagectomies, laryngectomies and pharyngectomies. Cases were divided into opioid dependent and non-opioid dependent cohorts based off International Classification of Disease, Ninth Revision Clinical Modification codes for opioid dependence. Demographic characteristics, comorbidities, charges, length of stay (LOS) and complications were compared using chi-square and t-test analysis for categorical and continuous variables, respectively. Demographic and surgical variables were further explored for association with prolonged LOS (>5 days) using univariate and multivariate logistic regressions. Findings were defined as statistically significant if p<.05. **Results:** 46,344 cases were identified. 120 (0.26%) were diagnosed with opioid dependence. Opioid dependence was associated with higher total charges ($158,712.46 vs. $107,465.94) (p<0.0001). Opioid dependence was associated with increased risk of venous thrombotic events (p=.01), gastrointestinal complications (p=.045), infection (p=.022) and dehiscence (p<0.0001). Univariate analysis revealed a 2.51 times higher odds of prolonged LOS in patients with opioid dependence (p<0.0001). Upon multivariate regression, when accounting for age 65+, race, sex, comorbidities, primary payer, and number of surgical complications, the higher odds of prolonged LOS in opioid dependent patients remained significant (odds ratio=1.82, p=0.03). **Conclusions:** For patients undergoing head and neck surgeries, opioid dependence is associated with prolonged LOS, higher charges and greater risk of complications.

11:26 **The Effects of Pulmonary Hypertension on Major Head and Neck Procedures**

Varesh R. Patel, BA, Newark, NJ; Nirali M. Patel, BA, Newark, NJ (Presenter); Mina T. Mikhael, BA, Newark, NJ; Peter F. Svider, MD, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ; Wayne D. Hsueh, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate how pulmonary hypertension impacts head and neck surgical complications and in-hospital mortality.

Objectives: Physiological changes due to pulmonary hypertension have the potential to complicate procedures. This study aims to provide an analysis of surgical outcomes, complications and associated comorbidities of those with pulmonary hypertension undergoing major head and neck surgeries. **Study Design:** Retrospective analysis utilizing the National Inpatient Sample (NIS) from 2002-2013. **Methods:** The NIS database was queried for head and neck procedures including pharyngectomies, esophagectomies, laryngectomies, mandibulectomies and glossectomies. Cases were divided into pulmonary hypertension (PHTN) and non-PHTN based off International Classification of Disease, Ninth Revision Clinical Modification codes. Demographic characteristics, comorbidities, charges, length of stay and complications were compared using chi-square and t-test analysis for categorical and continuous variables, respectively. Demographic variables and comorbidities were further explored for association with in-hospital mortality using univariate and multivariate logistic regressions. Findings with p<0.05 were defined as statistically significant. **Results:** 46,311 cases were identified. 238 (0.51%) had a diagnosis of PHTN. PHTN was associated with higher total charges ($162,021.06 vs. $107,309.46) (p<0.0001) and longer hospital stays (15.8 vs. 11.5 days) (p<0.0001). PHTN was associated with an increased risk of cardiac complications (p<0.0001), iatrogenic pulmonary embolism (p=0.001), pulmonary edema (p=0.003), venous thrombotic events (p<0.0001), pneumonia (p=0.027), pulmonary insufficiency (p<0.0001), tracheostomy (p=0.007) and urinary/renal complications (p=0.006). Univariate and multivariate regression analysis revealed no significant change in in-hospital mortality for those with PHTN (odds ratio =1.055 (0.485-2.296)). **Conclusions:** For patients undergoing head and neck surgeries, pulmonary hypertension is associated with an increase in complications, length of stay and hospital charges. The odds of in-hospital mortality are not significantly different for those with PHTN.

11:33 **Outpatient Parotidectomy: A Safe and Feasible Alternative to Inpatient Surgery**

Margaret C. Michel, BS, Washington, DC; Sean B. Bury, MD, Washington, DC; Collin F. Mulcahy, MD, Washington, DC; Daniel A. Benito, MD, Washington, DC; Punam G. Thakkar, MD, Washington, DC; Arjun S. Joshi, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the feasibility and safety of outpatient parotidectomy for carefully selected patients.

Objectives: Parotidectomy has traditionally been regarded as an inpatient procedure. Recent literature suggests that outpatient head and neck surgery is just as safe as inpatient surgery, may decrease costs, and improve patient satisfaction. Although data exists for a wide range of outpatient surgical procedures, there is limited recent literature examining the viability of outpatient parotidectomy. **Study Design:** A cohort of patients who underwent parotidectomy over a 7 year period was retrospectively studied in a single institution. Patients were divided by inpatient or outpatient status. **Methods:** Complication and readmission rates for both outpatient and inpatient groups was tabulated. Complications that were analyzed included infection, seroma, sialocele, salivary fistula, hematoma, and flap necrosis. **Results:** Over a period of 7 years, a total of 168 patients had available data for analysis. 10 of the 168 patients had complications (6.0%). 7 of 104 (6.7%) outpatients and 3 of 64 (4.7%) inpatients had complications. The most common outpatient complication was sialocele (2.9%). Among the inpatient group, complications consisted of wound infection requiring readmission, hematoma, and facial nerve injury. However, in this group neck dissection was not excluded and was significantly higher for inpatient

procedures, as was malignant resection (p<0.001). There was no statistically significant difference in overall complication rate between the two groups (p=0.743). To our knowledge, this is the largest reported series relating to outpatient parotidectomy. **Conclusions:** Our results suggest that outcomes are comparable between inpatient and outpatient parotidectomy groups. Outpatient parotidectomy appears to be a safe and viable alternative.

11:40 **Parathyroid Protection with the Transoral Endoscopic Thyroidectomy Vestibular Approach (TOETVA)**

Christopher R. Razavi, MD, Baltimore, MD; Lena W. Chen, BA, Baltimore, MD; Ralph P. Tufano, MD MBA, Baltimore, MD; Jonathon O. Russell, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the technical aspects of transoral endoscopic thyroidectomy vestibular approach (TOETVA) that may facilitate parathyroid gland visualization, protection, and preservation.

Objectives: Parathyroid gland devascularization/inadvertent removal is the most common complication after thyroidectomy. As such, many novel techniques have been described to facilitate parathyroid identification/protection. Some have postulated that transoral endoscopic thyroidectomy vestibular approach (TOETVA) may also enhance parathyroid preservation, given the favorable angle of dissection and endoscopic magnification of the procedure. We sought to evaluate our efficacy in parathyroid preservation with TOETVA in the context of our transcervical thyroidectomy (TCT) outcomes. **Study Design:** Retrospective review. **Methods:** All cases of TOETVA for total thyroidectomy were reviewed and compared to the same number of the most recent total TCTs by a single surgeon. Cases where concomitant procedures were performed were excluded. Postoperative intact parathyroid hormone (PTH) was utilized as a surrogate for parathyroid protection, with values < 10pg/mL noted to be abnormal, as this is outside our laboratory's reference range and is a risk factor for postoperative hypocalcemia. The rate of inadvertent parathyroidectomy (including intracapsular glands) was also compared between cohorts. **Results:** 25 patients were identified in each cohort. Median operative time was 170 (127-398) vs. 117 (82-173) minutes (TOETVA vs. TCT, p < 0.001). 3/25 (12%) vs. 6/25 (24%) patients were found to have PTH < 10pg/mL in the TOETVA and TCT cohorts respectively (p =0.46). Inadvertent parathyroidectomy was performed in 4/25 (16%) TOETVA patients vs. 9/25 (36%) TCT patients (p=0.20). There was no incidence of permanent mental or recurrent laryngeal nerve injury in either cohort. **Conclusions:** There was a higher rate of parathyroid protection in the TOETVA cohort, though this did not reach statistical significance given sample size limitations.

11:47 **Patterns of Subsequent Cancer Diagnosis in Older Patients with Head and Neck Squamous Cell Carcinoma: A Population Based Analysis**

John F. Ryan, BS, Baltimore, MD; Amanda L. Blackford, ScM, Baltimore, MD; David Lim, MS, Baltimore, MD; David W. Eisele, MD, Baltimore, MD; Carole Fakhry, MD MPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the risk of subsequent cancer diagnosis in patients diagnosed with head and neck squamous cell carcinoma and to compare the differences in risk between oropharynx cancer patients and non-oropharynx cancer patients.

Objectives: To determine whether the rate of subsequent cancer diagnoses after initial head and neck squamous cell carcinoma (HNSCC) diagnosis differs for patients with oropharynx cancers (OPC) and non-oropharynx cancers (non-OPC). **Study Design:** Retrospective, population based cohort study of patients with HNSCC diagnosed between 2004-2011 in the Surveillance, Epidemiology, and End Results Medicare database. **Methods:** Descriptive statistics, Fisher's exact test, Kaplan-Meier method, competing risks regression, Poisson regression. **Results:** Of 10,518 patients with HNSCC, 2,497 (23.7%) had oropharynx primaries. Median followup was 6.3 years. During follow-up, 1,767 (16.8%) were diagnosed with a subsequent cancer. The rate of subsequent cancer diagnoses was lower for OPC patients than non-OPC patients (4.8 vs. 6.1 per 100 P-Y; Rate Ratio = 0.78, 95% CI = 0.70, 0.87, p<0.0001). The time from HNSCC to a second primary diagnosis was longer for OPC than non-OPC patients (13.5% v. 16.1% by 5 years, HR = 0.76 95% CI = 0.68, 0.86, p < 0.001). For OPC and non-OPC patients, the most common subsequent diagnoses were lung, HNSCC, and gastrointestinal primaries. OPC patients had lower risk than non-OPC patients of lung primary diagnosis (HR = 0.585, 95% CI = 0.467, 0.732). However, the risk of diagnosis with a second HNSCC (HR = 0.794, 95% CI = 0.600, 1.050) or gastrointestinal (HR = 0.889, 95% CI =0.668, 1.181) primary was similar for OPC and non-OPC patients. **Conclusions:** Patients with HNSCC are at risk of subsequent cancer diagnosis. OPC patients have a lower risk than non-OPC patients. The most common diagnoses for both are lung, HNSCC, and gastrointestinal primaries.

11:54 **Q&A**

12:00 - 1:00 ***Lunch/Visit Exhibits/View Posters - Ballroom***

10:00 - 12:00 CONCURRENT SESSION 5B
OTOLOGY/NEUROTOLOGY - CAROUSEL ROOM

Moderator: Maroun T. Semaan, MD, Cleveland, OH

10:00 **Patterns and Severity of Transverse Sinus Stenosis in Patients with Pulsatile Tinnitus Associated with Sigmoid Sinus Wall Anomalies**

Daniel A. Hewes, MD, Cleveland, OH; Prashant Raghavan, MBBS, Baltimore, MD; David J. Eisenman, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the association between sigmoid sinus wall anomalies and transverse sinus stenosis, and describe the typical patterns of stenosis found in that population.

Objectives: Describe the location and severity of transverse sinus stenosis (TSS) in a consecutive series of patients with intraoperatively confirmed sigmoid sinus wall abnormalities (SSWA). **Study Design:** Retrospective review of consecutive patients over a 5 year period in a single institution. **Methods:** Imaging studies from patients undergoing sinus wall reconstruction for pulsatile tinnitus (PT) associated with SSWA were reviewed. Qualitative and quantitative analyses of the TSS, including the side, type, location, extent and severity, were performed, and compared with normal controls, and historical controls with idiopathic intracranial hypertension (IIH). **Results:** 26 of 36 subjects had adequate imaging data. The majority of subjects had some degree of bilateral TSS, and the majority of stenoses involved the distal transverse sinus. Subjects with diverticulum were significantly more likely than those with dehiscence to have ipsilateral distal TSS (16/16 vs. 4/10, p=0.009). The mean minimum transverse sinus diameter, stenosis severity grade, and overall posterior venous sinus outflow were significantly worse in the subjects as compared to normal controls ($p \leq 0.002$), though not as severe as the comparable values in historical controls with IIH ($p<0.003$). **Conclusions:** Subjects with SSWA have a high incidence of TSS, with patterns differing between those with dehiscence and diverticulum. Severity of TSS and overall posterior fossa venous outflow is worse as compared to normal controls, but not as severe as in subjects with IIH. These findings have implications for the pathophysiology and management of SSWA.

10:07 **Bulk of Bone for BAHA in Children 0-4 Years of Age**

Kareem M. Al-Mulki, BA, Atlanta, GA; Nadja Kadom, MD, Atlanta, GA; Norman Wendell Todd, MD MPH, Atlanta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to know where bulk of bone is available for installation of bone anchored hearing aid in a young child.

Objectives: FDA approval for bone anchored hearing aids is age 5 years, too old to take advantage of auditory neural plasticity. Prior work suggests at least 5mm of bone depth is available at the sinodural site (the topmost axial CT image that includes any contiguously adjacent petrous ridge) for patients age 0-4 years with unilateral isolated aural atresia. We seek to describe in patients with congenital unilateral isolated aural atresia, bone bulk at the most lateral extent of the sinodural trough, perpendicular to the cortical surface. **Study Design:** Retrospective case series. **Methods:** Existing temporal bone CT scans of 14 children, imaged at 0-4 years of age, with isolated unilateral aural atresia were studied. 3 dimensional models were created. **Results:** The 3D models showed that there is enough space to position, with a 2mm buffer of surrounding bone from dura mater and sigmoid sinus, a screw 2mm in diameter and 5mm long in 8 of 14 ears. Interestingly, bone bulk was not related to age. The 3D models showed that the sinodural site itself does not guide to the bone bulk, so individual ear 3D modeling would be needed to guide each screw implant. **Conclusions:** The bulk of bone at the sinodural site in some patients with unilateral isolated aural atresia, age 0-4 years, was sufficient to accommodate (with a surrounding 2mm thick bone buffer) a 2mm diameter screw, 5mm long. Such screw bone surface area is about the same as presently available BAHA.

10:14 **Lloyd A. Storrs Jr., MD Resident Research Award - Southern Section**
Evaluating Correlation between Hearing Loss and Middle Ear Volume in Patients with a Tympanic Membrane Perforation

Garrett G. Casale, MD, Charlottesville, VA; Ellen C. Shaffrey, BS, Charlottesville, VA; Bradley W. Kesser, MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the relationship between middle ear volume and hearing loss in the setting of a tympanic membrane perforation and discuss the difference between measuring middle ear volume anatomically and deriving middle ear volume from tympanometry.

Objectives: To investigate a possible correlation between the degree of conductive hearing loss (CHL) caused by an isolated tympanic membrane (TM) perforation and middle ear volume measured anatomically. **Study Design:** Retro-

spective chart, audiometry, and computed tomography (CT) imaging review. **Methods:** Adult patients with a diagnosis of isolated TM perforation between 2010 and 2018 were identified and their audiometric data collected. Middle ear volume was then calculated based on segmentation analysis from the patient's head or temporal bone CT scan. Univariate analysis was performed to determine a correlation between the calculated middle ear volume on CT imaging and the degree of conductive hearing loss as measured by the air bone gap on standard audiometry. Calculated middle ear volume was also compared to middle volume reported on tympanometry. **Results:** Greater middle ear volume correlated with smaller air bone gap; this trend approached but did not reach statistical significance (p=0.09). There was a statistically significant difference between middle ear volume as determined by segmentation analysis compared to that determined by tympanometry (absolute average percent difference=33.8%; range -49.5% to +155.2%; p=0.026). **Conclusions:** As previously reported, middle ear volume may be correlated to degree of conductive hearing loss in the setting of isolated TM perforation, but our analysis did not reach statistical significance. Calculated middle ear volume by segmentation analysis on CT imaging may be a more accurate estimate of middle ear volume than tympanometry.

10:21 **VEMP Tuning Changes in Meniere's Disease Stages**

Stefania Goncalves, MD, Miami, FL; Simon Ignacio Angeli, MD, Miami, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the potential uses of VEMP in Meniere's disease, the differences in VEMP results when comparing active versus inactive Meniere's, as well as age related variations in VEMP testing.

Objectives: To test the hypothesis that VEMP tuning changes correlate with the different stages of Meniere's disease. **Study Design:** Retrospective clinical review. **Methods:** Retrospective review of patients with unilateral definite Meniere who completed cervical and ocular VEMP (2011-2015). Non-Meniere patients were used for comparison. Meniere patients were further classified using two staging systems: 1) the 1995 AAO-HNS staging; and 2) based on symptoms at the time of testing as active (at least two definite vertigo attacks and documented hearing change within the preceding 2 months) and stable (one or no vertigo attack and stable hearing). Relationships between age, diagnostic categories, Meniere stages and the 1000Hz to 500Hz ratio (VEMP tuning) were explored. **Results:** There were 77 patients, 30 with non-Meniere vertigo and 47 with Meniere (31 with active and 16 with stable disease). Meniere patients were more likely to have abnormal cVEMP tuning demonstrated by increased amplitude ratio 1/0.5 kHz (PPV=93.1%, SENS=67.5%, SPEC=81.82%) than non-Meniere patients. VEMP responses were frequently absent in AAOHNS stages III and IV, and this precluded comparisons based on this staging system. However, the 1/0.5 kHz cVEMP ratio was significantly higher in active than stable Meniere (p=0.0035, ANOVA). In non-Meniere patients and nonaffected ears of Meniere patients, the 1/0.5 kHz ratio increased by a decrease of the 500 Hz response with increasing age, noticeably after age 54 years. **Conclusions:** The VEMP amplitude ratio 1/0.5 kHz is elevated in active Meniere. VEMP tuning has the potential to be a useful measure to monitor disease progression and the effect of therapy.

10:28 **Assessment of Surgical Skills Using Intraoperative Videos of Mastoidectomies**

Kyle D. Kulbarsh, MPhil, Charleston, SC; Charmee H. Mehta, BSPH, Charleston, SC; James R. Dornhoffer, MD, Charleston, SC; Michaela F. Close, BS, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the value of intraoperative recordings as a training tool and describe specific surgical skills during a mastoidectomy that are correlated with efficiency.

Objectives: Evaluate the use of intraoperative videos as a method for measuring surgical skills and identify specific metrics otolaryngologists use to assess surgical technique. **Study Design:** Single response survey. **Methods:** Questionnaires containing a one minute recording of a mastoidectomy performed by attending and resident physicians at various levels of training were sent to ACGME accredited otolaryngology and neurotology training programs. Attending and resident surgeons were asked to observe the videos and evaluate overall efficiency, specific technical attributes, and completion of surgical steps. **Results:** Physicians at all levels could consistently differentiate between the training levels of the recorded surgeons (e.g., attending or resident, p=0.04); they also graded the general efficiency of each video and individual technical attributes in like fashion. There were some differences in the perception of specific technical skills. Namely, senior surgeons were more likely to affirm deliberate use of suction (p<0.001) and irrigation (p<0.001) than were resident physicians. Several specific techniques were consistently linked with more senior surgeons and perceived efficiency; including, increased strokes per minute (p<0.001), visual field clearance (p=0.035), time on bone (p=0.004), use of the side of the bit (p=0.011), and suction movement (0<0.001). **Conclusions:** Our results validate the use of surgical videos as a tool to assess surgical skills in attending and resident physicians. Additionally, our study identifies modifiable techniques linked to increased surgical efficiency and training level. This research indicates that intraoperative videos could be used as both a tool for evaluating general surgical competency and as a means for providing specific technical feedback to guide trainee surgeons.

10:35 **Utility of Balloon Dilation of the Eustachian Tube for Military Divers and Aviators**

Edward R. Utz, MD, San Diego, CA; Austin J. Labanc, DO, San Diego, CA; Mikal J. Nelson, MD, San Diego, CA; Philip A. Gaudreau, MD, San Diego, CA; Sean R. Wise, MD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss treatment options for patients suffering from baro-challenge induced eustachian tube dysfunction when pressure equalization tubes are not a viable option.

Objectives: Chronic dilatory eustachian tube dysfunction (ETD) poses unique treatment problems with military personnel working in hyper and hypobaric environments. Military pilots and divers rely on the ability to equalize the middle ear to safely and effectively perform their duties. Temporary pressure equalization tubes are physically disqualifying for dive and flight duties, and are not a viable treatment option. Our objective was to evaluate the effectiveness of balloon dilation (tuboplasty) of the eustachian tube (BET) in active duty military personnel working in hyper and hypobaric environments suffering from baro-challenge induced ETD using functional outcomes. **Study Design:** Retrospective cohort study. **Methods:** Military divers and aviators with baro-challenge induced ETD resulting in disqualification from performing flight and dive duties were seen at a tertiary referral center and underwent BET. Main outcome measures include return to duty, requiring a successful hyperbaric chamber test or return to the hyper or hypobaric environment without ETD symptoms, and pre- and post-dilation eustachian tube dysfunction questionnaire (ETDQ-7) scores. **Results:** We observed 86% (12/14) of subjects returned to duty with an average return to duty time of 7.2 weeks. ETDQ-7 scores improved from a mean of 4.41 (2.14-6.57) pre-dilation to 2.20 (1.40-4.57) post-dilation (Z=-2.80, $p < 0.025$). **Conclusions:** We have found BET to be safe and effective in our military population who work in hyper and hypobaric environments. With over 80% of subjects returning to duty with improvement in ETD symptoms, BET is an important treatment to improve the quality of life for our aviators and divers and maintain operational readiness of our fighting forces.

10:42 **Eustachian Tube Dysfunction in Children with Cleft Palate: Tympanometric Time to Event Analysis**

Mena Said, BS, Sacramento, CA; Samantha N. McKinney, AuD F-AAA, Sacramento, CA; Ahmed G. Bayoumi, MB BCh CCRC, Sacramento, CA; Travis T. Tollefson, MD MPH, Sacramento, CA; Jamie Funamura, MD, Sacramento, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to better understand the time course of eustachian tube dysfunction in children with cleft palate in order to inform management of middle ear disease in these patients.

Objectives: 1) Perform time to event analysis of the duration of eustachian tube dysfunction in children with cleft palate; and 2) determine predictive characteristics of decreased time to type A tympanograms in children with cleft palate. **Study Design:** Retrospective chart review. **Methods:** Children with cleft palate born from 2003-2007 and treated at the study institution were included to allow for 10 years of longitudinal followup of tympanometric data. The association between time to achievement of type A tympanograms with patient demographics, clinical characteristics, and otologic history was evaluated using time to event analysis and compared with long rank tests. Adjusted and unadjusted hazard ratios were estimated using Cox proportional hazard models. **Results:** Among the 146 patients, the median time to type A tympanogram was 11.0 [10.5, 12.1] years and 11.2 [10.5, 11.8] years for the left and right ear, respectively. No demographic or clinical characteristics were significant predictors (e.g. Veau type of cleft). On univariate analysis (unadjusted hazard ratios), tube placements after the age of 3, 5, 7, or 10 years were associated with longer time to normal tympanograms ($p<0.05$). On multivariate analysis (adjusted hazard ratios), both tube placement after the age of 3 and myringoplasty/tympanoplasty for chronic perforation were predictive of a slower time to type A tympanogram ($p<0.05$). **Conclusions:** Our findings describe the slow resolution of eustachian tube dysfunction over time, with need for tympanostomy tubes after the age of 3 or myringoplasty/tympanoplasty for chronic perforation as predictive of a longer time to type A tympanogram in children with cleft palate.

10:49 **Q&A**

10:55 - 12:00 **MENIERE'S DISEASE: PEARLS IN PATIENT MANAGEMENT**
Moderator: Sujana S. Chandrasekhar, MD FACS, New York, NY
Panelists: **Introduction and overview including clinical questions**
Sujana S. Chandrasekhar, MD FACS, New York, NY
Making a Diagnosis: Understanding Testing in Meniere's
Yuri Agrawal, MD, Baltimore, MD
When Is it Meniere's and When Is it Migraine?
Hamid R. Djalilian, MD, Irvine, CA
Dietary Counseling for Meniere's - What Works and Why?
Mia E. Miller, MD, Los Angeles, CA
Systemic Medications: Diuretics, Steroids, Betahistine, Antihistamines, Antivirals, Allergy Treatment
Brian W. Blakley, MD PhD FACS, Winnipeg, MB Canada
Inner Ear Pharmacology - Steroids, Gentamicin, Other
Soha N. Ghossaini, MD FACS, Auburndale, NY
Surgery for Meniere's: PE Tubes, Meniett, ELS, Vestibular Nerve Section, Labyrinthectomy
Mia E. Miller, MD, Los Angeles, CA

11:55 **Q&A**

Noon - 1:00 ***Lunch/Visit Exhibits/View Posters - Ballroom***

12:10 - 1:00 **TIPS FOR PEER-REVIEWING FROM THE EDITORS** ***- Open to current and potential reviewers for The Laryngoscope and Laryngoscope Investigative Otolaryngology (attendees should bring lunch from the buffet to the seminar)***

1:10 - 3:05 CONCURRENT SESSION 6A
PEDIATRIC OTOLARYNGOLOGY - CROWN ROOM

Moderator: Sherard A. Tatum, MD FACS, Syracuse, NY

1:10 **Cytokeratin Expression in Respiratory Progenitor Cells in Mouse Model of Orthotopic Segmental Tracheal Replacement**
Matthew G. Wiet, MS, Columbus, OH; Audrey L. White, BS, Columbus, OH; Sayali Dharmadhikari, MS, Columbus, OH; Susan D. Reynolds, PhD, Columbus, OH; Tendy Chiang, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) explain the cytokeratin expression in respiratory progenitor cells in a mouse model of segmental tracheal replacement; 2) discuss future directions of tissue engineering strategies for long segmental trachea defect repair; and 3) compare basal cell responses in different airway injury models.

Objectives: Segmental trachea replacement with biologic or synthetic materials is fraught with complications. In airway injury models, basal cell cytokeratin 14 (K14) is upregulated in areas of epithelial repair. Our aim was to define basal cell cytokeratin expression in tracheal replacement during early and late time points. **Study Design:** Syngeneic mouse tracheas were harvested and orthotopically implanted into mice. Basal cell cytokeratin expression in the trachea was then determined using immunofluorescence. **Methods:** C57BL/6 mice underwent harvest of 5 mm tracheal segments. Syngeneic grafts were orthotopically implanted into a host animal. Planned euthanasia was performed at days 0, 3, 7, 14, 30, 60 and months 6 and 12 (N=4/group). Host and graft airway was explanted, processed, embedded, sectioned longitudinally, and stained with antibodies specific to keratin 5 and keratin 14. Photomicrographs were analyzed using stereology methods. Statistical analysis was performed using the Kruskal-Wallis one way analysis of variance to compare host and graft regions within a time point or over multiple time points. **Results:** Stereologic quantification revealed there were no differences in volume of nuclei/area of basement membrane (¼m3/¼m2), total keratin 5 cell mass (¼m3/¼m2) or total keratin 14 cell mass (¼m3/¼m2) between regions (proximal host, donor, distal host) within each individual time point ($p > 0.05$). There was no difference in expression of each individual region between time points ($p > 0.05$). **Conclusions:** In contrast with other models of airway injury, syngeneic tracheal replacement does not result in K14 upregulation. This serves as a foundation to understanding the natural history of basal cell phenotype during long segment tracheal replacement.

1:17 **Validation of the Maxillary Roof for Avoiding Skull Base Injury in Pediatric Sinus Surgery**

Sean S. Evans, MD, Birmingham, AL; Catherine H. Banks, MBChB FRACS, Sydney, NSW Australia; Joshua J. Richman, MD PhD, Birmingham, AL; Audie L. Woolley, MD, Birmingham, AL; Bradford A. Woodworth, MD, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate safe anatomic dissection of the pediatric skull base using a fixed surgical landmark.

Objectives: To determine if the maxillary roof can be used as a safe landmark to avoid iatrogenic skull base injury in pediatric sinonasal surgery. To our knowledge, we are the first to objectively assess fixed anatomic surgical landmarks in the pediatric population. **Study Design:** Retrospective review of all children undergoing CT scan of the sinuses and facial bones at the emergency department of a tertiary children's hospital over the course of a year. **Methods:** Maximum maxillary and minimum cribriform and planum sphenoidale heights were measured with reference to the nasal floor. Statistics were carried out via Shapiro-Wilks test and a p-value of 0.05 was deemed statistically significant. **Results:** 307 unique patient encounters were reviewed, of which 38.9% were female (n= 122; p = 0.58). Patients were stratified into seven age groups ranging from 1 month to 24 years old. In all patients, the maximum maxillary height was below the level of the lowest measured cribriform and planum heights. Inter- and intra-rater reliability and accuracy were verified through blinded review by an additional otolaryngologist as well as blinded re-review by the primary author (rho = 0.99 and 0.98 respectively, p = <0.001). The use of coronal only assessment due to incomplete sagittal reformatting availability was confirmed through blinded review of ten available sagittal reformats (rho = 1.00, p = <0.001). **Conclusions:** Despite variation in sinus growth patterns and development observed in the pediatric population, we are the first to validate the maxillary sinus roof as a fixed anatomic landmark to avoid iatrogenic skull base injury.

1:24 **Detection of Pepsin in Oral Secretions of Infants with and without Laryngomalacia**

Miles J. Klimara, BA, Milwaukee, WI; Nikki Johnston, PhD, Milwaukee, WI (Presenter); Tina L. Samuels, MS, Milwaukee, WI; Robert H. Chun, MD, Milwaukee, WI; Michael E. McCormick, MD, Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the prevalence of laryngopharyngeal reflux in pediatric patients with and without laryngomalacia, as determined by the presence or absence of pepsin in saliva.

Objectives: Laryngomalacia is a common cause of stridor associated with laryngopharyngeal reflux (LPR). Although pepsin in operative supraglottic lavage specimens has been associated with severe laryngomalacia, its presence in oral secretions of ambulatory patients with less severe disease is unknown. **Study Design:** Prospective case control study comparing patients in an ambulatory setting under 2 years old with laryngomalacia to children without laryngomalacia. **Methods:** Children less than 2 years old with laryngomalacia diagnosed by flexible laryngoscopy and children without stridor were selected. Oral secretion samples were obtained in clinic from all subjects. Pepsin, IL-1², and IL-8 enzyme linked immunosorbent assay were performed. **Results:** Sixteen laryngomalacia and sixteen control patients were enrolled. Pepsin was detected more frequently in oral secretions of patients with laryngomalacia (13/16) than in controls (2/16; p < 0.001). Higher median pepsin was observed in laryngomalacia than control specimens (p < 0.001). Four patients with laryngomalacia developed symptoms requiring supraglottoplasty. All 4 had salivary specimens positive for pepsin, but there was no significant association between the presence or level of pepsin and severity of laryngomalacia or need for operative management. No significant associations were found in the levels or presence of salivary IL-1² or IL-8 and other measures such as the presence or level of pepsin, laryngomalacia vs. control group, or need for operative management. **Conclusions:** Pepsin in salivary specimens demonstrated an association with laryngomalacia, supporting the use of salivary pepsin as a noninvasive tool for future investigation of LPR in patients with laryngomalacia of varying degrees of severity.

1:31 **Clinical and Radiological Features of Ectopic Cervical Thymus in Children**

Patricia L. Purcell, MD, Toronto, ON Canada; Faisal Zawawi, MD MSc FRCSC, Toronto, ON Canada; Evan J. Propst, MD MSc FRCSC, Toronto, ON Canada; Blake C. Papsin, MD MSc FRCSC, Toronto, ON Canada; Susan I. Blaser, MD FRCP(C), Toronto, ON Canada; Nikolaus E. Wolter, MD MSc FRCSC, Toronto, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the clinical and radiographic findings that are characteristic of ectopic cervical thymus in children.

Objectives: Ectopic thymus is a rare, benign lesion that can be a diagnostic challenge. This study evaluated the presentation and management of children diagnosed radiographically with ectopic cervical thymus. **Study Design:** Retrospective chart review. **Methods:** A retrospective chart review of 98 patients diagnosed radiographically with ectopic cervical thymus at our institution was performed. Patient age, clinical presentation, radiological imaging, pathology, management and outcome were collected. **Results:** One hundred and four masses were identified. The median (IQR) age at pre-

sentation was 5.4 (2.6-10.1) years. The youngest patient was identified at 9 days old. Thyroid mass was the presenting complaint for 20.4% (20/98) of patients, 11.2% (11/98) presented with neck mass, 2.0% (2/98) with dyspnea and the remainder were asymptomatic and found incidentally on imaging. Ultrasound was used for diagnosis in 95.9% (95/98) of patients, MRI in 18% (18/98), and CT scan in 10% (10/98). Forty-nine percent (51/104) of masses were found in the central neck, 36.5% (38/104) were intrathyroidal, and 14.4% were in the lateral neck. 10.1% (10/98) of patients had bilateral lesions. The majority of patients were managed conservatively and only 3.1% required surgery. Patients were followed for a median (IQR) of 0.8 (0.19-2.4) years with a maximum of 11.5 years. No patients developed malignant transformation. **Conclusions:** Traditionally, surgical excision was required for diagnosis of ectopic cervical thymus, but advancements in imaging have allowed characterization without surgical morbidity. We identified 104 lesions and followed 96.9% of patients conservatively with no cases of malignant transformation. Ectopic thymus can be diagnosed radiographically and followed conservatively in the majority of cases.

1:38 **Treatment of Children with Obstructive Sleep Apnea and Laryngomalacia: The Role of Laser Supraglottoplasty, a Randomized Controlled Trial**

Alhasan N. Elghouche, MD MS, Indianapolis, IN; Bruce H. Matt, MD MSc FAAP FACS, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of laser supraglottoplasty in the treatment of children with obstructive sleep apnea and laryngomalacia.

Objectives: To determine the effectiveness of supraglottoplasty in treating children with OSA and laryngomalacia. **Study Design:** A prospective, randomized, controlled trial was designed comparing patients treated with adenotonsillectomy and laser supraglottoplasty to those treated with adenotonsillectomy alone. **Methods:** Pediatric patients with obstructive sleep apnea and laryngomalacia were randomized to undergo adenotonsillectomy alone or in addition to laser supraglottoplasty. All patients underwent preoperative polysomnogram. The primary outcomes were changes in polysomnogram measurements. Other outcomes were collected including demographic and associated clinical data (e.g., postoperative length of stay, complications, etc.). **Results:** There were 152 eligible patients enrolled in the study with 83 (54.6%) completing the study and 69 (45.4%) not completing the study (i.e., they did not undergo postoperative polysomnogram). Among patients completing the study, 22 were in the laser supraglottoplasty arm and 61 were in the no laser supraglottoplasty arm. No significant difference in measured polysomnogram outcomes was noted. There was no difference in complication rates or postoperative length of stay between the two arms. **Conclusions:** Laser supraglottoplasty does not increase morbidity in surgical treatment of pediatric OSA and does not increase postoperative length of stay. Laryngomalacia is present among older children with OSA not only infants. More research is needed to further elucidate the role of supraglottoplasty in treatment of pediatric obstructive sleep apnea.

1:45 **Perception of Secondary Cleft Lip Deformity in the Pediatric Population, a Pilot Study**

Emily E. Karp, BS, Minneapolis, MN; Andrew R. Scott, MD, Boston, MA; Sivakumar Chinnadurai, MD MPH, Minneapolis, MN; Katherine B. Martin, PhD, Falls Church, VA; Brianne B. Roby, MD, St. Paul, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to compare changes in perception of secondary cleft lip deformity as a child ages.

Objectives: To measure children's perception of secondary cleft lip deformity (SCLD) using objective eye tracking technology and subjective responses on a survey and to determine if perception changes with age. **Study Design:** Prospective randomized control. **Methods:** Four age groups (5, 10, 13, and 16 years old) viewed images of children with SCLD of varying degrees and control images without SCLD while wearing eye tracking glasses. The participants answered survey questions relating to facial asymmetry of the images as they viewed the images and gaze fixation was recorded. **Results:** There were 61 participants divided among the age groups. All age ranges had a longer average eye tracking gaze time of the SCLD images than control images. 5 year olds spent less time looking to the mouth region with the SCLD than older ages. Across all age groups, SCLD images were more likely to look subjectively different on the survey question. However, the kindergarten age group was less able to differentiate SCLD images from control images when asked if they noticed a difference. **Conclusions:** Eye tracking highlighted objective differences in the way older children directed their gaze to SCLD, especially increased gaze time of the cleft lip, that is less noticeable to younger children. This measured, objective difference was further supported by the results of a subjective survey. A better understanding of peer perception has the potential to guide future interventions for SCLD and other facial deformities in pediatric patients.

1:52 **Resource Utilization of Intraoperative Cultures for Pediatric Deep Neck Space Abscesses**

Sophie G. Shay, MD, Milwaukee, WI; Sarah Khayat, MD, Chicago, IL; Rebecca Xu, MD, Chicago, IL; Taher Valika, MD, Chicago, IL; Sameer J. Patel, MD, Chicago, IL; Jennifer M. Lavin, MD MS, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the utility of

ordering intraoperative bacterial, fungal, and acid fast bacilli cultures when draining retropharyngeal, parapharyngeal, and peritonsillar abscesses.

Objectives: Retropharyngeal (RP), parapharyngeal (PP), and peritonsillar (PT) abscesses are common pediatric deep neck space infections (DNSI). Despite established literature on DNSI microbiology, obtaining intraoperative cultures remains commonplace. The objective was to evaluate the resource utilization of intraoperative cultures when draining RP, PP, and PT abscesses. **Study Design:** Retrospective chart review. **Methods:** Pediatric patients (age <18.0 years) who underwent surgical drainage of a RP, PP, and/or PT abscess between January 2013 and June 2018 were reviewed. Changes in antimicrobials based on intraoperative culture results were determined. Fisher's exact test and linear regression models were used where appropriate. **Results:** Eighty-eight patients underwent surgical drainage, of which 80 patients (mean age 7.51 years) had intraoperative bacterial cultures (27 RP, 21 PP, and 32 PT). Among 35 patients with fungal and acid fast bacilli cultures, there were no positive results. Seven patients (8.8%) had culture directed changes in treatment; none of these patients had a PT abscess. Age was inversely associated with culture directed changes ($p=0.033$) while the use of blood cultures ($p=0.024$) and higher number of cultures taken during admission ($p=0.033$) were positively associated with culture directed treatment changes. Duration of admission ($p<0.001$) and history of prior DNSI ($p=0.001$) were associated with number of cultures obtained. **Conclusions:** Younger children with RP and PP abscesses are most likely to benefit from intraoperative bacterial cultures. Cultures of PT abscesses are unlikely to change clinical management. Fungal and acid fast bacilli cultures are unlikely to yield clinically useful information. Prudent use of intraoperative cultures may decrease the use of hospital resources and admission related costs.

1:59 **Q&A**

2:05 - 3:00 **COLLABORATIVE PANEL WITH AMERICAN SOCIETY OF PEDIATRIC OTOLARYNGOLOGY: PEDIATRIC MULTIDISCIPLINARY TEAMS**
Moderator: Dana M. Thompson, MD FACS, Chicago, IL
Panelists: **Value of Teams in the CI/SNHL Population**
Blake C. Papsin, MD FACS, Toronto, ON Canada
Value of Teams in Pediatric Voice Disorders
Alessandro de Alarcon, MD MPH, Cincinnati, OH
Craniofacial Teams and VPI
Amelia F. Drake, MD FACS, Chapel Hill, NC
Aerodigestive Teams
Shelagh A. Cofer, MD, Rochester, MN

3:00 **Q&A**

3:10 - 3:30 **Break/View Posters - Ballroom**

1:10 - 3:05 CONCURRENT SESSION 6B
GENERAL AND SLEEP MEDICINE - CAROUSEL ROOM

1:10 - 2:05 **CHALLENGES TO PROFESSIONALISM IN OUR HEALTHCARE SYSTEM 2019**
Moderator: Gerald B. Healy, MD FACS, Boston, MA
Panelists: Stanley M. Shapshay, MD FACS, Albany, NY
Jonas T. Johnson, MD FACS, Pittsburgh, PA

2:05 **Q&A**

Moderator: Liana Puscas, MD MHS MA FACS, Durham, NC

2:10 **Francis L. Lederer, MD Resident Research Award - Middle Section**
Polysomnographic Outcomes in Children under 3 Years with Mild Obstructive Sleep Apnea Treated with Observation
Douglas C. Von Allmen, MD, Cincinnati, OH; Kathleen M. Sarber, MD, Cincinnati, OH; Javier Howard, BS MPH, Cincinnati, OH; Raisa Tikhtman, BS, Cincinnati, OH; David F. Smith, MD, Cincinnati, OH; Stacey L. Ishman, MD MPH, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the resolution rate of mild OSA in a cohort of children under 3 years of age treated with observation and discuss factors associated with

improvement of OSA in children under 3 years of age with mild obstructive sleep apnea.

Objectives: Mild obstructive sleep apnea (OSA), especially in young children, is often treated with observation. However, there is little evidence regarding the efficacy of this approach. Our aim was to assess the impact observation on the polysomnographic outcomes of children under 3 years with mild OSA. **Study Design:** Retrospective chart review. **Methods:** We reviewed children (<3 years) diagnosed with mild OSA (obstructive apnea hypopnea index [oAHI] <= 5 events/hour) treated with observation between 2012-2017 with at least 2 polysomnograms between 3 and 12 months apart. Demographic data and comorbid diagnoses were collected. We assessed pre- and post-treatment oAHI, oxygen saturation nadir, and end tidal carbon dioxide (ETCO2) >50mmHg. **Results:** Twenty-six children met inclusion criteria; median age was 7.2 months (95% confidence interval (CI):1.2-22.8). Nine (35%) were female and 24 (92%) were white. Median body mass index percentile was 39 (95% CI:1-76). Comorbidities included genetic syndromes (50%), cardiac disease (42.3%), reactive airway disease (23.1%) and prematurity (7.7%). The oAHI significantly decreased from 2.7 events/hour (95% CI:1-4.5) to 1.3 events/hour (95% CI:0-4.5, P=0.013). There was no significant improvement in saturation nadir (baseline median=86%, P=0.76) or ETCO2>50mmHg (baseline median=0, P=0.34). OSA resolved in 8 patients (31%) and worsened in 1 (3.9%). While age, sex, genetic syndrome, reactive airway disease, and cardiac disease were significant on univariable regression, none were significant in multivariable regression. **Conclusions:** In our cohort, resolution of mild OSA occurred in about one-third of patients with observation alone. In a multivariable model, none of the measured factors (including age, sex, and genetic syndrome) predicted resolution.

2:17 **Polysomnographic Outcomes in Children with Down Syndrome and Mild Obstructive Sleep Apnea Treated with Medication versus Oxygen or Observation Alone**

Javier J.M. Howard, BS MPH, Cincinnati, OH; Kathleen M. Sarber, MD, Cincinnati, OH; Wenwen Yu, MD, Shanghai, China; David F. Smith, MD PhD, Cincinnati, OH; Narong Simakajornboon, MD, Cincinnati, OH; Stacey L. Ishman, MD MPH, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss factors associated with persistence or worsening of OSA in children with Down syndrome; and 2) compare the effectiveness of medication to observation on polysomnographic parameters in a cohort of children with Down syndrome.

Objectives: Both nasal steroids and oral antileukotrienes are effective in the treatment of mild OSA (OSA) in healthy children. However, their efficacy is unknown in children with Down syndrome (DS). Here we examine the effect of medical therapy versus observation versus oxygen on polysomnographic outcomes for these children. **Study Design:** Retrospective chart review. **Methods:** We reviewed children (<18 years) diagnosed with DS and mild OSA (obstructive apnea hypopnea index [oAHI] <= 5 events/hour) treated nonsurgically (with supplemental oxygen, medication, or observation) between 2012-2017. Demographic data, comorbid diagnoses, and pre- and post-treatment polysomnograms were analyzed. We assessed pre- and post-treatment oAHI, saturation nadir, % total sleep time (TST) in rapid eye movement (REM), and end-tidal carbon dioxide (ETCO2) >50mmHg. **Results:** Twenty-four children met inclusion criteria; 10 treated with medication, 1 with oxygen, and 13 with observation; baseline oAHI was 3.5, 3.3, and 2.9 events/hour, respectively. Demographics between groups were similar. There was no significant change in oAHI, oxygen saturation nadir, ETCO2, or % TST in REM after treatment for any treatment group. OSA resolved in 1 patient in the observation group and 2 patients in the medication group. OSA worsened in 2 patients each in the medication and observation groups. Resolution of OSA was seen in 20% treated with medication, 7.7% with observation, 0% with oxygen (P= 0.82). **Conclusions:** In our cohort, resolution of mild OSA was low. This suggests that consideration should be given to multimodality treatments in children with DS and mild OSA. Prospective studies will help establish effectiveness in this cohort.

2:25 **The Association between Asthma, Obesity, and Severe OSA among Pediatric Patients - A Case Control Series**

Ajay Narayanan, BS, Dallas, TX; Ahana Yogesh, BA, Dallas, TX; Ron B. Mitchell, MD, Dallas, TX; Romaine F. Johnson, MD, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the association between asthma, obesity, and severe obstructive sleep apnea (OSA) among pediatric patients.

Objectives: To study a cohort of children, ages 9 to 17, referred for full night polysomnography due to suspicion of OSA. We examined the relationship between asthma, obesity, and severe OSA. **Study Design:** A retrospective case control analysis. **Methods:** We performed an analysis of children, ages 9 to 17, who underwent full night polysomnography. The primary outcome was to determine the relationship between asthma, obesity, and severe OSA (AHI>=10). We used multiple logistic regression analysis to estimate these associations after controlling for commonly associated conditions such as age, gender, race, income, and tonsillar hypertrophy). A p-value of <= .05 was considered significant. **Results:** The study included 367 children (mean (SD) age 14 years (1.8), 56% male, 43% Hispanic). The prevalence of asthma was 188/367 (52%), obesity was 197/367 (54%), and severe OSA was 109/367 (30%). Severe OSA was less likely in asthmatics (coefficient = -0.60; SE = 0.23; p = .01; odds ratio = 0.55; 95% CI 0.34 to 0.88) and more likely with obesity (coefficient = 0.87; SE = 0.24; p < .001; odds ratio = 2.4; 95% CI 1.5 to 3.9). The presence of asthma reduced the likelihood of severe

OSA by an average of 14% among obese patients and 9% among non-obese patients. These relationships held even after controlling for age, sex, race, income, and tonsillar hypertrophy. **Conclusions:** The presence of asthma reduced while obesity increased the likelihood of severe OSA among a large cohort of older children referred for polysomnography. Further research is indicated regarding these relationships.

2:32 **Ketorolac Usage in Perioperative Tonsillectomy and Uvulopalatopharyngoplasty**
Kathleen E. McClain, DO, Detroit, MI; Amy M. Williams, PhD, Detroit, MI; Zaahir Turfe, MD, Detroit, MI; Kathleen L. Yaremchuk, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the safety and effectiveness of ketorolac usage in tonsillectomy and uvulopalatopharyngoplasty.

Objectives: Post-tonsillectomy and uvulopalatopharyngoplasty pain can be very severe. Ketorolac is a nonsteroidal anti-inflammatory drug (NSAID) that can be administered for analgesia in these patients. In the literature, ketorolac has been associated with an increased risk of bleeding in otolaryngology. However, many other surgical fields utilize this medicine for pain control. The goal of this study was to analyze the effectiveness of ketorolac usage after tonsillectomy and uvulopalatopharyngoplasty in adults on postoperative pain control and postoperative hemorrhage rates. **Study Design:** This is a retrospective study of a single provider analyzing the electronic medical records of patients aged greater than 18 who underwent uvulopalatopharyngoplasty, and/or tonsillectomy between 2013 - 2017. **Methods:** Effectiveness of analgesia was assessed using postoperative patient calls regarding pain management and pain medication refills. Hemorrhage rates were assessed based upon whether or not patients presented to the emergency room complaining of bleeding. **Results:** There was no significant difference in the postoperative hemorrhage rates between ketorolac and control groups (p-value 0.331). Furthermore, there was no significant difference in number of postoperative phone calls regarding pain between the ketorolac and control groups (p-value 0.641). **Conclusions:** Ketorolac does not increase postoperative hemorrhage rates nor does it affect the number of patient pain related phone calls. Therefore, data from this study infers that a five day course of ketorolac can safely be used as an effective analgesic postoperatively for tonsillectomy and uvulopalatopharyngoplasty.

2:39 **Rare Electrosurgical Complications during Tonsillectomy: Analysis of National Adverse Event Reporting**
Alisa Yamasaki, MD, Boston, MA; Neil Bhattacharyya, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to highlight the utility of the OpenFDA program database and characterize the FDA reported adverse events associated with the use of electrosurgical devices for tonsillectomy, the most common devices involved in these events, and the patient and provider sequelae related to these events.

Objectives: To identify FDA reported adverse events related to electrosurgical devices during tonsillectomy and characterize the most common devices and patient/provider sequelae. **Study Design:** Retrospective analysis of FDA database of adverse device related events. **Methods:** Data were extracted from the OpenFDA database for all adverse events reported for electrosurgical devices used in tonsillectomies from January 2008 to December 2017. Adverse events were classified by device, event type, etiology, complication severity, and patient disposition. **Results:** 620 adverse events were identified with 367 events (59%) leading to known bodily harm to patient/provider. Device malfunction was the most common adverse event (205 events, 33%), followed by burns in 166 patient (27%) and 2 provider events (<1%). Burn injuries occurred most frequently with coblation devices (70 events, 42% of burn events), monopolar electrocautery (41 events, 24%), electrosurgical generators (19 events, 11%), and suction electrocautery (17 events, 10%). Patient burns most commonly involved the oral cavity (135 events, 80% of burn events) and were first degree (29 events, 17%). Postoperative bleeding (160 events, 26%; 2 deaths) and intraoperative fire (74 events, 12%) were also reported. Patient complications were typically managed conservatively (19% of patient events), with 53 events (14%) requiring additional surgery and 13 events (4%) involving unplanned admission. Device malfunctions caused significant delay/cancellation in 21% of occurrences. **Conclusions:** A wide variety of complications may occur with various devices during tonsillectomy with significant harms and sequelae. Surgeons must understand the nature of such complications to facilitate safe perioperative care and inform preoperative patient discussions.

2:46 **The Use of Peer Tympanic Membrane Photographs in Preclinical Otoscopy Training**
Amir A. Hakimi, BS, North Chicago, IL; David S. Foulad, MD, Loma Linda, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to more effectively teach otoscopy to preclinical students and accurately measure students' mastery of this critical skill.

Objectives: To offer a novel teaching adjunct to otoscopy training and a tool to objectively measure student performance. **Study Design:** Observational study. **Methods:** In preparation for the study, four individuals with healthy ears were recruited as volunteer patients and had photographs taken from their tympanic membrane in one ear. Twenty-six first year

medical students with no prior otoscopy experience volunteered to perform otoscopy on three of these participants' ears. Participants were first given a brief didactic introduction on otoscopy and proper use of an otoscope. Each participant was permitted two minutes to examine each ear and to identify the correct tympanic membrane picture among four unlabeled printed images. An otolaryngology attending and internal medicine attending served as positive controls, examining the volunteer patients and accurately identifying the tympanic membrane in all cases. The following day, the students were given a formal lecture on the anatomy of the ear, otoscopy, and otoscopy technique. They were then given a thirty minute period to practice otoscopy on their colleagues. After this session, students were tested again with three new volunteer patients. Student performance at each session was compared using the Wilcoxon test, with statistical significance assigned to P-values < 0.05. **Results:** Student performance greatly improved between the first and second otoscopy sessions. The difference in correct identification of tympanic membranes was statistically significant as a cohort ($p<0.01$). Individually, performance on the otoscopy assessment improved in twenty-one students (81%). **Conclusions:** The use of peer tympanic membrane images can significantly improve otoscopy technique in preclinical students and can serve as an objective measure of otoscopy mastery.

2:53 **The Current State of Surgical Simulation Training in Otolaryngology: A Systematic Review of Otolaryngology Boot Camp Outcomes and an Analysis of Current Trends in Simulation**

Mohamedkazim M. Alwani, MD, Indianapolis, IN; Michael K. Larsen, BA, Indianapolis, IN; Elhaam H. Bandali, MS, Indianapolis, IN; Taha Z. Shipchandler, MD, Indianapolis, IN; Jonathan Ting, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation participants should gain an understanding of the current state of simulation training in otolaryngology, available simulation models, current trends, and the role of boot camps.

Objectives: To evaluate the effectiveness of otolaryngology simulation boot camps in enhancing knowledge, skills, and confidence among trainees and to describe the latest trends and surgical simulation models available for otolaryngologic training. **Study Design:** Qualitative systematic review. **Methods:** Ovid/Medline, PubMed, Embase, Web of Science, Cochrane, and Google Scholar databases were searched from their inception with cross-referenced subject headings of ENT boot camp and associated terms. Studies included in our review reported empirical data on effectiveness of ENT boot camps. Information from each study was systematically extracted. A summary analysis of the latest trends and simulation models was also conducted. **Results:** Summary analysis of 112 articles revealed 83 simulation models currently available (29 otologic, 7 head & neck, 2 reconstructive, 14 sinus, 18 laryngologic airway, 13 pediatric). Six articles met inclusion criteria for systematic review. Combined effect sizes showed significant improvement in knowledge (d = 1.28; 95% CI 0.92 1.48; P < 0.001), skills (d = 1.89; 95% CI 1.61 2.09; P < 0.001), and confidence (d = 1.68; 95% CI 1.32 2.18; P < 0.001) of participants. A lack of standard, syllabized approach was noted. **Conclusions:** Current literature assessing the use of several simulation models supports the beneficial role of simulation in otolaryngologic surgical training. There remains an opportunity to better establish a well structured, uniform, and standardized approach to simulation activities across otolaryngology training programs.

3:00 **Do Standardized Letters of Recommendation Forms in Otolaryngology Residency Applications Correlate with Objective Data?**

Alice L. Tang, MD, Cincinnati, OH; Javier V. Howard, BA, Cincinnati, OH; James C. Wang, MD PhD, Cincinnati, OH; Meredith E. Tabangin, MPH, Cincinnati, OH; Mekibib Altaye, PhD, Cincinnati, OH; Sarah L. Rohde, MD, Nashville, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to critically evaluate the utility of standardized letter of recommendation forms.

Objectives: To evaluate if standardized letter of recommendations commonly used for medical students applying to otolaryngology residency correlate with objective data in the application. **Study Design:** Letter of recommendation forms using rating scales in different categories are commonly used by evaluators because of its ease of use and standardization. Given that these are subjectively scored, it is unknown how well these are correlated with objective data presented in the application to otolaryngology residency. **Methods:** Applications to our otolaryngology residency were evaluated for the use of standardized letters of recommendations in the academic cycle of 2017. Standardized letters were scaled and scored to determine if certain categories were correlated with objective data (board scores and number of presentations/publications) provided in their application. Spearman correlation coefficient was employed to evaluate the strength of the relationship between the scaled score and objective data provided. **Results:** There were 217 applications to our otolaryngology residency that contained standardized recommendations. Of these applications, 472 standardized letters were scored in categories of medical knowledge, research and commitment to academic medicine. Total publications and presentations were weakly correlated with commitment to academic medicine (0.36, $p<0.0001$, $n=376$) and mildly correlated with research (0.44, $p<0.0001$, $n=358$). Medical knowledge was weakly correlated with step 1 scores (0.22, $p<0.0001$) and step 2 scores (0.18, $p=0.0003$). **Conclusions:** Subjective research and commitment to academic medicine rating scores were weak to mildly correlated with greater academic productivity. Similarly, medical knowledge scores were weakly correlated with step 1/2 scores. Standardized letters of recommendation forms should be evaluated critically when

reviewing applications as they may not be well correlated with objective data provided in the application.

3:05 **Q&A**

3:10 - 3:30 ***Break/View Posters - Ballroom***

3:30 - 4:40 - GENERAL SESSION - CROWN ROOM

3:30 - 4:30 pm **MILITARY MEDICAL PANEL: DEPARTMENT OF DEFENSE RESEARCH AND INNOVATION FROM THE BATTLEFIELD TO THE BEDSIDE**

Moderators: Michael E. Hoffer, MD, CAPT (ret) MC USN, Miami, FL and
Earl H. Harley, MD, CAPT (ret) MC USN, Washington, DC

Panelists:

Optimizing Warfighter Performance: A DoD Clinical and Operational Research Update
LaKeisha Henry, COL MC USAF, Division Chief, DoD Hearing Center of Excellence, San Antonio, TX
Tanisha Hammill, PhD, Branch Chief, DoD Hearing Center of Excellence, San Antonio, TX

Acquired Olfactory Sensory Losses and Potential Therapeutic Role for Basal Stem Cells
Bradley J. Goldstein, MD PhD FACS, University of Florida, Miami, FL

A Rabbit Model for Airway Stenosis and Treatment with Fractionated CO2 Laser
Philip A. Gaudreau, MD LCDR MC USN, Assistant Chair, Department of Otolaryngology, Naval Medical Center, San Diego

En Route Care of the Battlefield Casualty
Guillermo J. Tellez, COL MC USAF, Command Surgeon, United States Southern Command, Miami, FL

4:30 **Q&A**

4:45 **ADJOURN SESSION**

5:00 MEET THE AUTHORS POSTER RECEPTION - for all attendees - Ballroom

6:15 PARTY - for all attendees - Ballroom
Buffett, beverages, and fun

Saturday

ALLERGY/RHINOLOGY

1. The Use of Diagnostic Imaging to Detect Intracranial Tumors in Idiopathic Olfactory Dysfunction: A Systematic Review

Jack L. Birkenbeuel, BS, Irvine, CA; Dillon C. Cheung, BS, Irvine, CA; Ronald Sahyouni, PhD, Irvine, CA; Janice T. Chua, BA, Irvine, CA; Joseph Ai Choy, BS, Irvine, CA; Edward C. Kuan, MD MBA, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the ability of diagnostic imaging in detecting sinonasal or intracranial neoplasms or any other pathology.

Objectives: To review the literature regarding the use of intracranial imaging as a screening method for idiopathic olfactory loss (IOL) and to review the incidence of identifying a sinonasal or intracranial neoplasm, or any other pathology, as a result of this intracranial imaging. **Study Design:** Systematic review. **Methods:** A systematic review of published English language literature was performed using PubMed, Ovid MEDLINE, and Cochrane databases. **Results:** Of the 597 available abstracts, 12 met the inclusion criteria for this review. Results varied greatly based on article type. Out of 487 eligible patients, intracranial imaging identified tumors causing IOL in 8 patients (1.6%). Findings ranged from 0% to 4.9% when omitting case reports and case series. Out of 470 eligible patients, intracranial imaging detected any pathology causing IOL in 64 patients (14%). Findings ranged from 0.77% to 36% when omitting case reports and case series. Out of 487 patients eligible IOL patients, 370 (76%) received intracranial imaging, ranging from 53% to 100%. **Conclusions:** In most cases, diagnostic imaging in IOL patients is frequently ordered, though the overall rate of detecting any pathology is considerable. More studies are needed to evaluate the utility and cost effectiveness of routine intracranial imaging in this setting to rule out tumor.

2. Functional Endoscopic Sinus Surgery and Sleep Outcomes in OSA Patients: A Systematic Review with Meta-Analysis

Joshua B. Calton, BS, Oakland, CA; Megan L. Durr, MD FACS, Oakland, CA; Jonathan Liang, MD FARS FACS, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of FESS on sleep outcomes in patients with sleep apnea.

Objectives: Previous systematic reviews have demonstrated minimal effect of nasal surgery on sleep outcomes in obstructive sleep apnea (OSA) patients. However, it remains unclear whether functional endoscopic sinus surgery (FESS) affects sleep outcomes in OSA patients. We aim to systematically review the literature to understand the role of FESS on sleep in OSA patients. **Study Design:** Systematic review with meta-analysis. **Methods:** PubMed, OVID, Cochrane, EMBASE, Scopus, and Web of Science were queried. Inclusion criteria included English language studies containing original data on FESS in OSA patients with reported outcome measures. Two investigators independently reviewed all manuscripts and performed quantitative meta-analysis using validated tools. Quality assessment was performed using the Newcastle-Ottawa scale. **Results:** 1,261 manuscripts were identified, 39 were included in full text review, and 3 met inclusion criteria 2 case series and 1 cohort study. Outcomes measured included AHI (2), low/mean SaO2 on polysomnography (2), SNOT 22 (1), and PSQI (1). Meta-analysis was performed on 2 studies. FESS demonstrated a standard mean difference of -0.13 (95% CI, -0.37 to 0.11), -0.26 (95% CI, -0.50 to -0.02), and -0.10 (95% CI, -0.34 to 0.14) for AHI, low SaO2, and mean SaO2, respectively. Negative values indicate improvement. **Conclusions:** FESS improves overnight low SaO2 value on polysomnography, but not AHI or mean SaO2. Although statistically significant, this is unlikely to translate into clinical significance. Our review and analysis demonstrate that FESS does not affect sleep outcomes in OSA patients, which is consistent with most other broader studies. Additional high level evidence will help to clarify the role of FESS in OSA patients.

3. Misdiagnosis of Rhinosinusitis in Primary Care: If not Chronic Rhinosinusitis, Do Patients Have Acute Rhinosinusitis?

Joshua B. Calton, BS, Oakland, CA; Christopher C. Xiao, MD, Oakland, CA; Mitchell Anderson, MS, Oakland, CA; Jonathan Liang, MD FACS FARS, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the diagnostic criteria for ARS and CRS, and also be able to identify difficulties in diagnosing these conditions.

Objectives: Acute (ARS) and chronic rhinosinusitis (CRS) are common conditions presenting to primary care. A recent study demonstrated 1% of patients diagnosed with CRS by primary care physicians actually met diagnostic criteria. We aim to evaluate whether ARS criteria were met in these CRS misdiagnosed patients and analyze subsequent medical therapies and evaluation. **Study Design:** Retrospective cohort study. **Methods:** We retrospectively reviewed adult patients diagnosed with CRS in 2016 based on ICD-10 codes from primary care departments. Patients diagnosed appropriately with CRS, and with previous CRS diagnosis or sinus surgery were excluded. AAO-HNS guidelines for ARS and CRS were used. **Results:** In

305 CRS misdiagnosed patients, only 31 (10.2%) met criteria for ARS. In the 208 (89.8%) who did not, 181 (66.1%) had symptoms <4 weeks, 214 (78.1%) had no drainage, and 50 (18.2%) had no congestion or pain/pressure. Therapy with antibiotics, oral steroids, nasal steroid sprays, and saline rinses occurred in 230 (75.4%), 34 (11.1%), 143 (46.9%), and 88 (28.9%), respectively. 65 (21.3%) underwent CT. 52 (17.0%) were evaluated by otolaryngology. Oral steroids were prescribed more to those who met ARS criteria, compared to those who did not (P=0.03318). No other significant differences were identified. **Conclusions:** Most patients misdiagnosed with CRS also did not meet criteria for ARS. Primary care should be familiar with ARS, as it accounts for over 30 million outpatient visits annually. ARS guidelines recommend conservative therapy and antibiotics; CRS guidelines favor additional oral corticosteroids. Further studies on ARS diagnostic challenges in primary care can help identify knowledge gaps and areas for improvement.

4. Spontaneous Involution of Juvenile Nasopharyngeal Angiofibromas: A Systematic Review

Janice T. Chua, BA, Irvine, CA; Joseph A. Choy, BS, Irvine, CA; Jack L. Birkenbeuel, BS, Irvine, CA; Dillon C. Cheung, BS, Irvine, CA; Edward C. Kuan, MD MBA, Irvine, CA; Naveen D. Bhandarkar, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe and summarize the reported cases of spontaneous JNA involution and discuss the potential factors associated with the growth and natural involution of these tumors.

Objectives: To review the literature on the incidence of and any associated factors for the involution or regression of juvenile nasopharyngeal angiofibromas (JNA). **Study Design:** Systematic review of studies using the Medline database. **Methods:** A systematic review of studies on JNA involution or regression from January 1950 to July 2018 was conducted. A query for articles related to JNA involution, along with bibliographies of those articles, was performed. Articles were examined for individual and aggregate patient data. Demographics, presenting symptoms, treatments, and outcomes were analyzed. **Results:** A total of 18 patients from 11 studies were included in this review. The mean reported age of diagnosis of JNA was 14.7 years (range, 12-21 years). Only 2 of the 18 patients included in the study demonstrated true spontaneous JNA involution with no prior treatment. Of the 16 cases which described the involution of residual or recurrent JNA post-treatment, 15 underwent surgical resection, 2 underwent adjuvant radiotherapy, and 3 patients underwent arterial embolization or ligation with or without surgery. Due to the limited number of reported cases, it is not currently possible to determine associated factors for spontaneous JNA involution from this review. **Conclusions:** Spontaneous regression of JNA is a rare occurrence that has been poorly characterized in the literature. The majority of included studies which report cases of spontaneous regression of JNA tumors are instead describing residual or recurrent tumors that have previously been treated. Further investigation exploring the natural involution and the potential role genetics and molecular biology play in the growth of these tumors is warranted.

5. Intraoperative Detection and Management of Internal Carotid Artery Thrombosis during Transsphenoidal Resection of Meningioma

Alhasan N. Elghouche, MD MS, Indianapolis, IN; Shaheryar Ansari, MD, Indianapolis, IN; Mitesh V. Shah, MD, Indianapolis, IN; Jonathan Y. Ting, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the value of intraoperative imaging modalities in the context of skull base surgery.

Objectives: A 68 year old female presented with headaches and a right visual field defect. Radiologic evaluation demonstrated a suprasellar mass with extension into the right cavernous sinus and displacement of the right optic nerve. Partial encasement of the cavernous segment of the right internal carotid artery was also noted. Given her visual deficit, an endoscopic expanded approach to this mass was performed and intraoperative magnetic resonance imaging was performed to verify extent of resection. Intraoperative imaging demonstrated complete resection but also revealed evolving thrombosis across the petrous and cavernous segments of the right internal carotid artery. The patient underwent immediate arteriogram with thrombectomy and stent placement with complete restoration of flow. The patient's postoperative course was uncomplicated. At followup one month after surgery, she has no visual complaints and no neurologic deficits. This case demonstrates the value of intraoperative imaging during endoscopic resection of skull base tumors. **Study Design:** NA. **Methods:** NA. **Results:** NA. **Conclusions:** None.

6. Transnasal Approach to Odontoid Resection in Pediatric Patients: A Single Institution's Experience

John D. Gettelfinger, MD, Indianapolis, IN; Jonathan Y. Ting, MD, Indianapolis, IN; Daniel H. Fulkerson, MD, South Bend, IN; Stephen K. Mendenhall, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the experience of a single institution with regard to transnasal approach to odontoidectomy, including complications and outcomes encountered.

Objectives: For patients with complications of compression of the craniovertebral junction, odontoidectomy is often required to achieve adequate decompression. The traditional approach for decompression involving a transoral approach

has been well studied, but the transnasal approach has relatively little data, especially in pediatric populations. This study looks at a single institution's experience with transnasal approach to odontoidectomy in pediatric patients. **Study Design:** Case series. **Methods:** A retrospective review of all cases utilizing a transnasal approach to odontoidectomy was performed from 2013 to present. We examined indication for procedure, length of surgery, length of stay, presence of complications, need for surgical airway, time to return to baseline feeding, and overall neurologic change. This was compared existing data on adult and pediatric transnasal odontoidectomy. **Results:** In four pediatric patients who underwent transnasal approach for odontoid resection, 3 had history of Chiari malformation. Average age was 12.25 years. All patients concurrently underwent cervical fusion. Average total length of surgery was 10 hours 59 minutes with average time of rhinologist involvement being 7 hours 42 minutes. No patients required new tracheostomy placement. All patients returned to baseline oral intake, most prior to discharge from the hospital. All patients had improvement in neurologic symptoms at time of first followup visit. Observed outcomes and rates of complication were comparable to existing data. **Conclusions:** The transnasal approach is a good alternative for odontoid resection that has provided encouraging results for our patients in terms of avoiding surgical airway, returning to baseline oral intake, and improving overall neurologic function.

7. Frailty as a Predictor of Short Term Outcomes and Cost of Care in Sinonasal Cancer Surgery

Alexander N. Goel, BA, Los Angeles, CA; Jivianne T. Lee, MD, Los Angeles, CA; Marilene B. Wang, MD, Los Angeles, CA; Jeffrey D. Suh, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of frailty on health outcomes and compare the predictive value of frailty with elderly age and comorbidity as they relate to adverse outcomes after sinonasal cancer surgery.

Objectives: Frailty, defined as a phenotype of decreased physiologic reserve and resistance to stressors, is increasingly recognized as a predictor of poor surgical outcomes independent of age or comorbidity. Patients with sinonasal tumors tend to be older and require complex, high morbidity surgical resections, and the impact of frailty in the elderly remains undefined. We aim to determine the relative predictive value of elderly age, comorbidity, and frailty for adverse outcomes in sinonasal cancer surgery. **Study Design:** Cross-sectional analysis. **Methods:** Data from the Nationwide Readmissions Database for 4,173 patients undergoing sinonasal cancer surgery from 2010 to 2014 was analyzed using multivariable regression modeling. Frailty was defined based on the frailty defining diagnostic clusters (e.g., malnutrition, difficulty walking, dementia) that comprise the Johns Hopkins Adjusted Clinical Groups frailty indicator. **Results:** Frailty was present in 7.5% of patients. Frailty was a stronger predictor than advanced comorbidity (defined as Charlson-Deyo score > / = 3) with respect to odds of intensive care unit level complications (OR 4.50 [2.64-7.66] vs. OR 4.00 [2.25-7.25]), non-home discharge (OR 2.73 [1.52-4.91] vs. OR 0.69 [0.32-1.47]), prolonged length of stay (defined as highest quartile) (OR 8.87 [5.04-15.60] vs. OR 3.22 [1.62-6.43]), and elevated hospital costs (highest quartile) (OR 5.22 [2.99-9.11] vs. OR 2.21 [1.29-3.79]). Frailty was also a stronger predictor than elderly age (> / = 80 years) with regard to complications, length of stay, and costs. **Conclusions:** Frailty appears to have a stronger and more consistent association with postoperative outcomes than age or comorbidity. Consideration of this metric may improve surgical risk stratification for patients undergoing surgery for sinonasal tumors.

8. Characterization of Sinus Disease in Patients with Yellow Nail Syndrome

Claudia N. Gutierrez, MS, Rochester, MN; Christopher M. Low, MD, Rochester, MN; Janalee K. Stokken, MD, Rochester, MN; Garret W. Choby, MD, Rochester, MN; Erin K. O'Brien, MD, Rochester, MN

Educational Objective: Explain the prevalence, diagnostic criteria and pathophysiology of yellow nail syndrome (YNS). Discuss the specific sinus manifestations of YNS and comorbid manifestations of the disease and possible treatment options.

Objectives: Yellow nail syndrome (YNS) is characterized by the triad of thickened yellow nails, primary lymphedema, and pulmonary manifestations. The purpose of this study is to describe the specific sinus manifestations of YNS and the comorbid manifestations of this disease. **Study Design:** A retrospective chart review identified 36 patients with a diagnosis of YNS and sinus disease between the dates of June 1998 to June 2018. **Methods:** Patient charts were reviewed and their symptoms of YNS and possible contributing factors, such as immunodeficiencies, were identified. The patients' CT scans were then scored by two different reviewers in a blinded manner using the Lund Mackay (LM) scoring system and averaged. **Results:** The LM score was 10.2± 0.5 (mean ± SD). The most common location of sinus disease, demonstrated by frothy secretions, was found primarily in the maxillary sinuses, 85%, followed by the posterior and anterior ethmoid, sphenoid, and frontal sinuses at 81%, 76%, 74%, and 54% respectively. Prevalence of chronic cough, bronchiectasis, lymphedema and pleural effusion in YNS patients with sinusitis was 86%, 65%, 39%, and 19%, respectively. Three patients (8%) had immunodeficiencies. **Conclusions:** This is the largest series describing the sinus manifestations of YNS. Sinus disease is common in YNS with frothy secretions in the maxillary sinuses and was associated with chronic cough or bronchiectasis more than pleural effusions or lymphedema.

9. Geographic Variation in Epistaxis Interventions among the Medicare Population
Kevin Hur, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the geographic variation in epistaxis interventions across the United States in the Medicare population.

Objectives: To quantify the utilization of epistaxis procedures in the Medicare population and assess whether geographic variability is associated with hypertension and oral anticoagulant use prevalence. **Study Design:** Cross-sectional study. **Methods:** Publicly available Medicare procedure and beneficiary data from 2013-2016 was extracted for all epistaxis procedures categorized as common procedural technology (CPT) code 30901, 30903, 30905, 30906, 31238, 30915, and 30920. Epistaxis procedures were analyzed by state, complexity, and provider type. Linear regression analysis was performed to examine associations with hypertension and oral anticoagulant use. **Results:** Over 4 years, 219,827 epistaxis procedures were performed on Medicare patients, 44.3% of which were categorized as CPT code 30901 or 30905. Otolaryngologists performed 92.6% of all epistaxis procedures. The frequency of epistaxis procedures performed by state ranged from 0.99 procedures per 10 thousand beneficiaries (PP10K) in Hawaii to 25.7 procedures PP10K in New Jersey. The percentage of epistaxis interventions categorized as complex (CPT 30903, 30906, 31238, 30915, 30920) in each state varied from 0% in North Dakota to 68.8% in New Mexico. Epistaxis procedure utilization was weakly correlated with the prevalence of hypertension in a state's Medicare population ($R2=0.08$, $p<0.05$) but there was no association with oral anticoagulant use. Utilization of complex epistaxis interventions was not correlated with the prevalence of hypertension or oral anticoagulant use. **Conclusions:** Otolaryngologists perform the vast majority of epistaxis procedures in the Medicare population. However, practice patterns vary widely across the United States. Hypertension and oral anticoagulant use are not associated with the utilization of more complex epistaxis interventions.

10. Graduated Approach for Resection of Large Paranasal Sinus Osteomas with Orbital Involvement
Qasim Husain, MD, Boston, MA; Catherine G. Banks, MD, Boston, MA; George A. Scangas, MD, Boston, MA; Ralph B. Metson, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the surgical approaches for paranasal sinus osteomas that involve the orbit.

Objectives: When osteomas of the paranasal sinuses extend into the orbit, extensive clinical symptoms may arise. We describe a stepwise approach for the surgical treatment of these challenging lesions. **Study Design:** Retrospective study. **Methods:** A database from the senior author was queried for patients with paranasal sinus osteomas who underwent surgical intervention. All osteomas with orbital involvement were identified after radiologic review. Patient demographics, clinical history, operative procedure, and clinical outcome were analyzed. **Results:** Six patients who had paranasal sinus osteomas with orbital involvement were identified. The average lesion size was 3.5cm (craniocaudal, range 1.7-4.2cm) x 2.4cm (transverse, range 2-2.9cm) x 3.2cm (anterior/posterior, range 2.1-4.2cm). The osteomas most frequently originated in the ethmoid sinus (83.3%), followed by the frontal sinus (16.6%). Four cases (66.6%) were treated with an entirely endoscopic approach. Two cases with extension into the frontal sinus were staged with an initial endoscopic subtotal resection followed by an osteoplastic flap (n=1) or trephination (n=1) approach for excision of remaining osteoma. Gross total resection was achieved in all 6 cases. There were no occurrences of cerebrospinal fluid leak or permanent diplopia. Average followup was 18 months (range 6-33 months). **Conclusions:** Large osteomas of the paranasal sinuses with orbital involvement can be safely resected with minimal patient morbidity. Osteomas originating in the ethmoid sinuses can usually be resected with an entirely endoscopic approach, whereas those with frontal sinus involvement may require a combined approach.

11. Socioeconomic and Demographic Determinants of Outcomes after Endoscopic Sinus Surgery
Aria Jafari, MD, San Diego, CA; Sarek A. Shen, BS, San Diego, CA; John Pang, MD, San Diego, CA; Adam S. DeConde, MD, San Diego, CA

Educational Objective: To describe the socioeconomic and demographic determinants of outcome after endoscopic sinus surgery (ESS).

Objectives: Socioeconomic factors have been shown to have a significant impact on healthcare utilization and surgical outcomes. The effect of these variables on health related quality of life (HRQoL) surrounding endoscopic sinus surgery (ESS) is not well established. Our goal was to investigate the association of several socioeconomic factors on HRQoL, as reflected by Sinonasal Outcome Test 22 (SNOT-22) score after ESS. **Study Design:** Retrospective review of prospectively collected data. **Methods:** 121 patients with chronic rhinosinusitis who underwent ESS between 11/2016 and 8/2017 were included. Socioeconomic and demographic data, surgical characteristics, baseline, and postoperative SNOT-22 scores were recorded. Univariate and multivariate regressions were performed to identify determinants of baseline clinical severity and improvement following ESS. **Results:** In a multivariate logistic regression model, below median income was associated with higher baseline ($^2=10.2$; 95% CI, 2.47-19.23; $p<0.05$) and postoperative SNOT-22 scores ($^2=11.0$; 95% CI, 1.91-20.1; $p<0.05$). Non-white ethnicity and increased distance to provider ($^2=0.13$; 95% CI, 0.31-0.02; $p<0.05$) was associated with lower absolute and relative postoperative improvement ($^2=9.8$; 95% CI, 2.35-18.23; $p<0.05$). Married

patients had increased improvement (^{2}=-0.11; p<0.05) after ESS. Surgical characteristics were not associated with the included variables. **Conclusions:** Overall, these data suggest that determinants of disease severity may be distinct from those affecting postoperative outcomes after ESS. We found that income is associated with disease severity at presentation, sociodemographic factors such as ethnicity, distance to provider, and marital status were predictive of improvement in HRQoL after ESS. Improved cross-cultural patient provider communication, access, and family support in the postoperative period may present an opportunity to enhance outcomes after ESS.

12. Translation, Cross-Cultural Adaptation, Statistical Validation of the Sino-Nasal Outcome Test-22 to Kenyan Swahili

Aria Jafari, MD, San Diego, CA; Sarek A. Shen, BS, San Diego, CA; Bharat A. Panuganti, MD, San Diego, CA; Bruce H. Campbell, MD, Milwaukee, WI; Henry N. Ngoitisi, MMED, Eldoret, UasinGishu Kenya; Adam S. DeConde, MD, San Diego, CA

Educational Objective: To describe the results from performing a translation, cross-cultural adaptation, statistical validation of the Sino-Nasal Outcome Test-22 (SNOT-22) to Kenyan Swahili.

Objectives: Health related quality of life instruments are useful in assessing the impact of medical or surgical intervention. Among patients with sinonasal disease, the Sino-Nasal Outcome Test 22 (SNOT-22) is a robust and widely utilized validated tool. However, no validated version of the SNOT-22 currently exists in Kenyan Swahili (Kiswahili). Our goal was to perform a translation and cross-cultural adaptation of the SNOT-22 questionnaire to Kiswahili. **Study Design:** A prospective case control study of adult patients with chronic rhinosinusitis (CRS) and healthy controls was performed at Moi Teaching and Referral Hospital in Eldoret, Kenya. **Methods:** The SNOT-22 was independently translated from English to Kiswahili then translated back to English by two bilingual translators. Discrepancies were reconciled to create a consolidated version. A pilot study was performed to assess comprehension and suitability. A final version was generated and administered to patients and controls. **Results:** The study included 48 subjects (12 patients, 36 controls). Internal consistency was high, with a Cronbach's alpha of .881 for patients and .981 for controls. The Pearson coefficient was calculated as .975, indicating good test-retest reliability and reproducibility. The instrument was able to detect differences between CRS patients and controls based on SNOT-22 scores (37.25 vs. 28.08, p<.04), demonstrating its validity. **Conclusions:** Our study demonstrates that the Kiswahili SNOT-22 has good internal consistency, reliability, reproducibility and statistical validity. Future assessment of responsiveness will be helpful in assuring the clinical validity of the instrument to assess quality of life and treatment effect in Kiswahili speaking patients.

13. Trends in Endoscopic Sinus Debridement in the Medicare Population: We Do A Lot. More Than We Should?

Rijul S. Kshirsagar, MD, Oakland, CA; Jonathan N. Liang, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe and discuss temporal and geographic trends in endoscopic debridement in the Medicare population. The participant should be able to compare these trends with sinus surgery and balloon sinuplasty trends.

Objectives: Nasal/sinus endoscopy with biopsy/polypectomy/debridement or current procedure terminology (CPT) code 31237 is one of the top 10 most frequent and highest billed otolaryngology procedures among Medicare patients. We analyzed temporal and geographic trends in endoscopic debridement and correlated these with sinus surgery and balloon sinuplasty trends. **Study Design:** Retrospective cross-sectional analysis. **Methods:** Medicare Part B national summary data files were analyzed from 2000 to 2016 for temporal trends of endoscopic debridement. Medicare physician and other supplier public use files detailing provider information were collected and analyzed from 2012 to 2016. Individual providers performing a reportable number of procedures were included. Linear regression was used to correlate endoscopic debridement, sinus surgery, and balloon sinuplasty procedures. **Results:** Between 2000 and 2016, the number of endoscopic debridement procedures increased from 31,579 to 79,762 (6.0% average annual growth). The annual total payments increased from $5,944,582 to $19,438,956 (8.4% average annual growth), with average allowed charge per procedure increasing from $188.24 to $243.71. The greatest and least number of debridement procedures occurred in the Southeast (12,703) and New England (1810) regions, respectively. There was a positive correlation between providers (n=752) performing endoscopic debridement and sinus surgery (r=0.31, p<0.001), similar to providers performing endoscopic debridement and balloon sinuplasty (r=0.29, p<0.001). **Conclusions:** Otolaryngologists continue to perform increasing numbers of endoscopic debridement and receive increasing payments. There is some geographic variation in these trends. Interestingly, amongst individual providers, there was positive correlation between the number of endoscopic debridement procedures and both the number of balloon sinuplasty and sinus surgery procedures.

14. Endoscopic, Transoral Retrieval of Infratemporal Fossa Foreign Bodies

Ashton E. Lehmann, MD, Boston, MA; George A. Scangas, MD, Boston, MA; Ralph Metson, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss iatrogenic sources of infratemporal fossa foreign bodies, to critically evaluate preoperative imaging in order to plan management

strategies for their retrieval, to explain surgical techniques for their removal, and to discuss postoperative outcomes of the minimally invasive endoscopic, transoral technique.

Objectives: To report management strategies and surgical techniques for removal of foreign bodies within the infratemporal fossa (ITF). **Study Design:** Case series. **Methods:** Six cases of ITF foreign bodies removed via image guided, endoscopic transoral approaches are presented. The specific preoperative imaging recommendations, description of surgical approaches, and postoperative outcomes are reported. **Results:** ITF foreign bodies included four hypodermic needles (length 19-33mm) broken off during dental anesthesia injections, a cottonoid surgical sponge lost during a facial fracture repair, and a maxillary molar displaced during wisdom tooth extraction. The duration of retained foreign bodies ranged from 6-146 days (median 17 days). All foreign bodies were identified and removed with an image guided endoscope passed through an intraoral incision. Subsites of location included the medial pterygoid muscle, masticator space, prestyloid parapharyngeal space, and pterygoid space. Complications were limited to transient postoperative lingual and inferior alveolar nerve sensory deficits in one patient. **Conclusions:** This case series demonstrates the safety and efficacy of a minimally invasive transoral approach, utilizing endoscopic instrumentation and image guidance, for the treatment of patients who present with foreign bodies of the ITF.

15. Is Chronic Sphenoid Sinusitis Associated with Pneumonia?

Robert A. McQuitty, BS, Galveston, TX; Roger D. Rui, BS, Galveston, TX; Mohamad R. Chaaban, MD MSCR MBA, Galveston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the association between chronic rhinosinusitis and pneumonia.

Objectives: Our objective in this study is to examine the association between chronic sphenoid sinusitis and the development of community acquired pneumonia. **Study Design:** Retrospective chart review. **Methods:** Retrospective chart review of chronic rhinosinusitis (CRS) patients that presented to a tertiary rhinology clinic from 2013-2015 was conducted. Patients were excluded if they were not seen for at least 2 years. Patients were categorized into CRS with sphenoid sinusitis (group A) and CRS without sphenoid sinusitis (group B). The latter group was divided into four categories according to their CT scan/endoscopy findings: mucosal thickening, partial opacification, complete opacification and purulent sphenoid drainage. Charts were then reviewed on whether the patients developed pneumonia within 2 years of their visit to the rhinologist. **Results:** 647 of 1,061 patients were included in the analysis. There were 178 (27.51%) patients in group A and 469 (72.49%) patients in group B. There were 41 total cases of pneumonia with 28 (68.29%) cases having chronic sphenoid sinusitis. Patients with sphenoid sinusitis were 7.08 (95% CI, 3.52-14.24) times more likely to have pneumonia. Patients with partial/complete opacification of the sphenoid sinus were 20.71 (95% CI, 9.25-46.38) times more likely to have pneumonia. Patients with only mucosal thickening of the sphenoid sinus did not have significantly increased odds of having pneumonia. **Conclusions:** Patients with chronic sphenoid sinusitis had a significantly increased risk of having pneumonia. Partial/complete opacification had the highest association with pneumonia.

16. Optical Coherence Tomography of Upper Respiratory Cilia

Tiffany T. Pham, MS, Irvine, CA; Lily Y. Chen, BS, Irvine, CA; Andrew E. Heidari, PhD, Irvine, CA; Naveen D. Bhandarkar, PhD, Irvine, CA; Zhongping Chen, PhD, Irvine, CA; Brian J.F. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the use of optical coherence tomography (OCT) to assess ciliary beat frequency (CBF). Participants should be able to understand the potential use of OCT to monitor cilia health and mucociliary clearance.

Objectives: Proper ciliary function is essential to mucociliary clearance. Developing an understanding of CBF could provide insight towards monitoring cilia health and its ability to clear mucosal debris. OCT, a minimally invasive imaging modality, is capable of resolving microscopic motion through intensity based Doppler variance. In this study, we utilized OCT to measure CBF of ex vivo human nasal and sinus mucosa. **Study Design:** Clinical observational study. **Methods:** Resected nasal and sinus mucosal tissues from patients undergoing functional endoscopic sinus surgery were imaged using a microscope OCT system. Samples treated with Hank's balanced salt solution, saline, and 1:1000 or 1:2000 concentrations of epinephrine were imaged for at least 5 minutes. A subset was imaged at both room temperature and 34°C. CBF was calculated using power thresholding of fluctuating intensity signals in a selected region of interest. **Results:** Measured CBF ranged from 5 to 9 Hz. CBF at 34°C compared to room temperature was generally 2 Hz higher. The application of HBSS, saline, 1:1000, and 1:2000 epinephrine increased CBF at 1 minute with subsequent decrease, noted significantly at 10 minutes. There were no significant differences between solution treatments. **Conclusions:** This study shows the efficacy of OCT to evaluate human cilia of the nasal and sinus mucosa. Temperature significantly increased CBF. Differences in sample area of cilia and potential exhaustion of energy supply may contribute to varying CBF measurements. Future in vivo studies are necessary to assess cilia in normal physiologic conditions.

17. Association between Objective Anosmia and Depression in Adults

Jamiluddin J. Qazi, BS, Charlottesville, VA; Jose L. Mattos, MD MPH, Charlottesville, VA (Presenter); Ian T. Churnin, MD, Charlottesville, VA; James H. Wilson, BS, Charlottesville, VA; Cyrelle-Elize R. Fermin, BS, Charlottesville, VA; Spencer C. Payne, MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the association between objective anosmia and risk of depressive symptoms.

Objectives: To characterize the association between objective olfactory and gustatory dysfunction and depression in older adults. **Study Design:** The 2013-2014 National Health and Nutrition Examination Survey (NHANES) data was used to investigate the relationship between smell and taste dysfunction and depression. **Methods:** Adults age 65 and older were included in the analysis. For smell status, subjects were divided in hyposmia, anosmia, and olfactory dysfunction (hyposmia + anosmia) using the Pocket Sniff Test. For taste status, subjects were evaluated using whole mouth quinine, 1M NaCl and 0.32M NaCl solutions. Indicator variables were made for subjects with both smell and taste dysfunction to determine if a combination of symptoms could predict depression. Depression status was evaluated using the nine item Patient Health Questionnaire (PHQ-9) using accepted cut-off values. Relevant demographic, socioeconomic, and comorbid factors were included in multivariate logistic regression models which accounted for the complex survey design of NHANES. **Results:** 931 subjects age 65 or older were included in the weighted analysis. In univariate analysis, dysosmia (OR = 2.193, P = 0.006) and hyposmia (OR = 2.512, P < 0.001) significantly predicted depression. Significance was lost in multivariate analysis. Anosmia significantly predicted depressive symptoms in multivariate analysis (OR = 2.484, P = 0.032) but not univariate. **Conclusions:** Smell dysfunction is an independent predictor of depressive symptoms in a representative sample of older adults in the United States after adjusting for relevant demographic factors and comorbidities.

18. Transient Abducens Nerve Palsy after Regional Anesthesia Following Endoscopic Sinus Surgery

Robert Saddawi-Konefka, MD PhD, San Diego, CA; Aria Jafari, MD, San Diego, CA; Adam S. DeConde, MD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify a novel consequence of employing a regional sphenopalatine block after endoscopic sinus surgery.

Objectives: As alternative strategies to control postoperative pain control become increasingly routine, we must recognize the rare consequences of using such novel therapies. **Study Design:** We present the case of a 53 year old female who experienced transient diplopia and abducens nerve palsy immediately after regional sphenopalatine blockade with Marcaine following endoscopic sinus surgery. **Methods:** A systematic review was performed in conjunction with this case report. **Results:** Review of the literature demonstrates similar unintended outcomes following the use of alternative postoperative analgesics. **Conclusions:** This work illustrates the need for vigilance as we employ new regimens to control postoperative pain and thwart the opioid epidemic.

19. Differences in Clinical Presentation of Chronic Rhinosinusitis in Pediatric Patients with Cystic Fibrosis Based on Severity of Disease

Gopi B. Shah, MD MPH, Dallas, TX; Ramya K. Krothapally, BA, Dallas, TX; Ashleigh A. Halderman, MD, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the presentation of chronic rhinosinusitis (CRS) and the efficacy of surgical management for CRS in children with mild versus severe cystic fibrosis (CF).

Objectives: To analyze the clinical presentation of chronic rhinosinusitis (CRS) and outcomes after functional endoscopic sinus surgery (FESS) in children with mild and severe CF. **Study Design:** Retrospective chart review. **Methods:** Pediatric CF patients who underwent FESS between 2003-2018 were retrospectively reviewed. Patient genotype, age at CF diagnosis, and pancreatic sufficiency status were used to group patients into severe and mild CF groups. Data including demographics, sinus symptoms, incidence of nasal polyposis, and pulmonary function testing were collected pre and postoperatively. **Results:** 22 patients met inclusion criteria. There were 11 males and 11 females; approximately 77% were Caucasian and 23% were Hispanic. Three (13.6%) patients had mild CF and nineteen (86.4%) patients had severe CF. Average age at FESS for the mild CF group and severe CF group was 3.33 years and 8.89 years respectively (p=0.0109). The overall cohort showed significant improvement in FEV1 at one year postoperatively (p = 0.0014, 95% CI -0.39 to -0.12). The severe group was significantly more likely to have both nasal polyps (66.7% vs 0%, p=0.016) but not to require revision FESS within one year (21.4% vs 0%, p=0.3125). **Conclusions:** This is the first study to investigate differences in the presentation of CF related CRS in pediatric patients based on CF disease severity. While this study was limited by size, the findings suggest that important differences may exist. Larger studies are needed to confirm these preliminary findings and to better understand the role disease severity plays in patient response to specific treatments or interventions such a FESS.

20. Effects of Eosinophilia and Nasal Polyposis on Quality of Life in Chronic Rhinosinusitis Patients with Concurrent Asthma

Sandra Y. Tadros, BS, Augusta, GA; Aykut A. Unsal, DO, Augusta, GA; Thomas W. Holmes, MD, Augusta, GA; Stilianos E. Kountakis, MD PhD, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate the effects of eosinophilia and nasal polyps on quality of life (QOL) improvement in asthmatic patients with chronic rhinosinusitis who were treated with surgery.

Objectives: Chronic rhinosinusitis (CRS) can be subclassified based on nasal polyposis and tissue eosinophilia. The goal of our study was to evaluate the relationship of eosinophilia and nasal polyps on quality of life (QOL) in asthmatic patients with CRS who were treated with surgery. **Study Design:** Retrospective chart review analysis. **Methods:** Patients with diagnosis of CRS who underwent sinus surgery were reviewed and subdivided based on presence or absence of asthma diagnosis. Groups were then subdivided based on tissue eosinophilia and nasal polyposis. Sinonasal Outcome Test (SNOT-22), Lund-Kennedy endoscopy scores, and Lund-McKay CT scores were compared preoperatively and postoperatively at 6 months-1 year, 2, 3, 4 and 5 years. T-test analysis was performed for statistical significance. **Results:** Of the 457 patients included, 92 had asthma with eCRScNP, 20 had asthma with eCRSsNP, 8 had asthma with neCRScNP, and 16 had asthma with neCRSsNP. eCRScNP showed no QOL difference preoperatively but is statistically different at the 1 and 2 year analysis, $p<0.03$. No significant QOL improvement in the eCRSsNP group appeared until 4 years, $p<0.008$. There was no significant QOL difference among the neCRS groups regardless of nasal polyposis. A statistical difference in endoscopy scores was seen among the preoperative neCRScNP, $p<0.001$, and eCRScNP from preoperatively until 5 years postoperatively, $p<0.03$. Finally, statistical significance appeared in preoperative CT scores analysis among the eCRScNP, $p<0.001$. **Conclusions:** Eosinophilic CRS with nasal polyposis has shown to decrease QOL improvement after sinus surgery in patients with concurrent asthma. They also have statistically significant higher Lund-Kennedy endoscopy and Lund-McKay CT scores compared to control groups.

21. Preventing Restenosis of Marsupialized Rathke's Cleft Cysts Using a Nasoseptal Flap Lining

Monica S. Trent, BS, Irvine, CA; Neil N. Luu, BA, Philadelphia, PA; Edward C. Kuan, MD MBA, Philadelphia, PA; Michael A. Kohanski, MD PHD, Philadelphia, PA; Charles C. Tong, MD, Philadelphia, PA; Bert W. O'Malley Jr., MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the surgical techniques that exist when performing a Rathke's cleft cyst marsupialization. Additionally, the participants should be proficient in comparing the techniques and explaining the benefits of using a nasoseptal flap lining to prevent stenosis of the cleft.

Objectives: Rathke's cleft cysts (RCCs) are rare, benign lesions formed from remnants of Rathke's pouch during embryologic development. However, following marsupialization, maintaining tract patency remains a challenge. Several techniques for decreasing stenosis have been described, including free mucosal grafting, silastic spacing, and using steroid eluting stents. Nasoseptal flaps (NSFs) have a reliable vascular supply and are widely utilized in skull base reconstruction. We present a novel technique to maintain patency of the marsupialized RCC cavity by lining it with a NSF to promote long term drainage and re-epithelialization of the RCC cavity. **Study Design:** Retrospective chart review. **Methods:** Retrospective review of all patients who underwent surgery for symptomatic RCCs. These patients underwent endoscopic endonasal surgery between February 3, 2016, and June 12, 2018, with marsupialization followed by circumferential NSF lining. Primary outcomes include symptomatic control, surgical complications, and RCC cavity patency. **Results:** Seven patients underwent RCC marsupialization with no intraoperative cerebrospinal fluid (CSF) leak, followed by circumferential lining of the marsupialized cavity with an NSF. In each case, no cyst reaccumulation or recurrent symptoms were noted, and the NSF lining provided long term patency of the tract out to a mean of 6.7 ± 10.1 months of followup, including one patient with sustained patency at 29 months followup. **Conclusions:** Utilization of the NSF to stent open the RCC cavity following marsupialization is a safe and effective means to prevent restenosis. Advantages include sustained patency of RCC cavity for complete drainage and a dependable vascular supply.

22. Gender and Chronic Rhinosinusitis: An Investigation of Subtypes and Quality of Life

Aykut A. Unsal, DO MS, Augusta, GA; Sandra Y. Tadros, BS, Augusta, GA; Thomas W. Holmes, MD, Augusta, GA; Stilianos E. Kountakis, MD PhD, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the different subtypes of CRS and the role gender demonstrates in quality of life outcomes.

Objectives: Chronic rhinosinusitis (CRS) is currently subclassified based on the presence of tissue eosinophilia and nasal polyposis. The goal of this study is to identify any differences in subtype presentation patterns and long term quality of life outcomes between men and women. **Study Design:** Retrospective chart review analysis. **Methods:** Patients with CRS who underwent surgical therapy were subdivided based on tissue eosinophilia, nasal polyposis, and gender.

Sinonasal Outcome Test (SNOT-22), Lund-Kennedy endoscopy scores, and Lund-McKay CT scores were compared preoperatively and postoperatively at 6 months-1 year, 2, 3, 4 and 5 year intervals. Student t-test analysis was performed for statistical significance. **Results:** Of the 457 patients included, 256 patients were diagnosed with eosinophilic CRS with nasal polyposis (eCRScNP), 33 with non-eosinophilic CRS with nasal polyposis (neCRScNP), 67 with eosinophilic CRS without nasal polyposis (eCRSsNP), and 101 with non-eosinophilic CRS without nasal polyposis (neCRSsNP). No significant differences in the distribution of CRS subtypes by gender was observed ($X2$ (3, N = 457) = 4.24, p = .23). Women with eCRScNP presented with worse QOL outcomes for all intervals up to 4 years ($p<.05$). Women with eCRSsNP, neCRScNP, and neCRSsNP also demonstrated worse QOL outcomes at 3 years, 1 year, and 1 year respectively ($p<.05$). Lund-Kennedy and Lund-McKay scores were worse in eCRSsNP preoperatively in men, but with improved endoscopy scores at 1 year ($p<.05$). **Conclusions:** This study represents the largest cohort investigating gender disparities amongst CRS disease patterns and quality of life indices to date. Overall, women demonstrated worse QOL outcomes as compared to men in all CRS subtypes.

23. Predictive Value of Olfactory Deficit for Future Cognitive Decline in Healthy Adults: A Systematic Review

Melina J. Windon, MD, Baltimore, MD; Sun Joo Kim, BS, Baltimore, MD; Esther Oh, MD PhD, Baltimore, MD; Sandra Lin, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to understand and discuss the utility of olfactory testing as a screening tool for incident cognitive decline.

Objectives: Dementia affects over 47 million people worldwide. The objective of this study was to explore whether olfactory impairment (OI), a well established predictive marker of conversion to dementia among those with mild cognitive impairment, is predictive of future cognitive decline among cognitively normal adults. **Study Design:** This was a systematic review encompassing the last 75 years in PubMed, EMBASE, and Cochrane. **Methods:** English language original articles longitudinally following cognitively normal adults with baseline OI in comparison to those without OI that examined for outcomes of cognitive impairment, cognitive decline or incident dementia were included. Study design, participant demographics, olfactory testing, cognitive decline or incident dementia were abstracted. Quality was assessed with the Newcastle-Ottawa scale. Two investigators independently reviewed all articles. **Results:** The search yielded 965 abstracts and titles, from which 17 full text articles were reviewed and 13 (n= 18,376) were included. Followup time ranged from 2 to 12 years, representing 119,532 person years. Studies included were longitudinal cohort with evidence level 2b and a mean quality assessment score of 8.6 (maximum 9). All studies (100%) found a statistically significant association between baseline OI and future cognitive decline compared with controls. Of studies with evaluable odds ratios, OI predicted 1.80 (95% CI 1.24-2.60) - 6.41 (95% CI 4.68-8.77) higher odds of future cognitive decline compared with controls. **Conclusions:** All studies reviewed concluded that OI predicts future cognitive decline among cognitively normal adults, strongly supporting olfactory evaluation as a low cost and widely available screening tool to identify adults at early risk of dementia.

FACIAL PLASTIC & RECONSTRUCTIVE

24. Chondrosarcoma of the Mandibular Coronoid Process with Custom PEEK Implant and Radial Forearm Free Flap Reconstruction

Benjamin F. Bitner, BS, Irvine, CA; Beverly Y. Wang, MD, Irvine, CA; Tjoson Tjoa, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss characteristics of mandibular chondrosarcomas and surgical management with the use of a PEEK implant and free tissue transfer to restore contour of the temporal scalp and zygomatic arch.

Objectives: Report a rare case of chondrosarcoma of the mandibular coronoid process and describe the surgical approach and use of vascularized tissue and PEEK implants in reconstruction. **Study Design:** Case report and literature review. **Methods:** A literature review was performed on PubMed searching keywords including coronoid chondrosarcoma, surgical approach, PEEK implant, zygomatic arch, and head and neck chondrosarcoma. **Results:** 40 year old male presented with an enlarging mass of the left face. He was found on imaging to have a lesion centered on the left coronoid process with expansion resulting in fractures of the zygomatic arch and temporal bone. A biopsy revealed chondrosarcoma. A combined hemicoronal, transparotid, and transcervical approach was performed. After en bloc resection, the temporal contour was restored with radial forearm free flap, and the zygomatic arch was reconstructed with a custom designed patient specific polyetheretherketone (PEEK) implant. Final pathology demonstrated low grade conventional chondrosarcoma. **Conclusions:** Chondrosarcomas are malignant cartilaginous tumors uncommonly found in the head and neck. The mandibular coronoid process is rarely involved, with only two previously reported cases in the current scientific literature. Due to limited coronoid tumor incidence and variability in local tissue involvement, location, and grade, surgical approach and reconstructive methods of adjacent structures have not been established. This case presents a successful surgical approach and the use of free tissue transfer and PEEK implant for reconstruction.

25. Association between Preoperative Serum Albumin Levels and Complications Following Free Flap Procedures

Chris B. Choi, BA, Newark, NJ; Michael W. Song, BA, Newark, NJ; Richard D. Bavier, BA, Newark, NJ; Soly Baredes, MD FACS, Newark, NJ; Richard C. Park, MD FACS, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the importance of preoperative albumin levels and their association with rates of complications following free flap surgery.

Objectives: To investigate the association between preoperative serum albumin levels and rates of postoperative complications in patients who underwent head and neck free flap surgery. **Study Design:** Retrospective database review. **Methods:** The 2005-2015 National Surgical Quality Improvement Program (NSQIP) database was used. Propensity score matching (PSM) was conducted to homogenize the study population. Chi-squared analysis and logistic regression were used to determine the independent effect of covariates on postoperative complication rates. **Results:** 1280 individuals with known preoperative serum albumin levels who received head and neck free flap surgery by otolaryngologists were identified. The median level (4.00 gm/dl) was used to separate patients into two cohorts (albumin <4 gm/dl) and (albumin = / > 4 gm/dl). A cohort of 1064 patients was matched using PSM. Propensity matching corrected for all significantly distributed comorbidities except for COPD, diabetes, disseminated cancer, dyspnea, functional health status, preoperative transfusion, wound infection, and weight loss. Multivariate regression analysis of this adjusted cohort indicated lower preoperative serum albumin levels were independently associated with higher rates of experiencing a complication following free flap surgery (HR 1.652, 95% CI 1.277 - 2.136, p<0.001). Analysis of individual complication rates revealed patients with lower preoperative albumin levels had higher risks of postoperative bleeding (HR 1.863, 95% CI 1.435 - 2.421, p<0.001) and ventilator assisted respiration during postoperative hospitalization (HR 2.058, 1.252 - 3.384, p=0.004). **Conclusions:** This analysis underscores optimizing nutrition prior to head and neck free flap surgery. Preoperative serum albumin levels can serve as a nutritional marker, as levels below 4.00 gm/dl are associated with higher risk of postoperative complications.

26. Surgical Reconstruction of Acquired Cocaine Induced Cleft Lip, a Case Report

David W. Chou, MD, Oakland, CA; Charles W. Shih, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the negative effects of chronic cocaine abuse on the midface structures and to demonstrate understanding of the modified Millard technique for surgical reconstruction of acquired cleft lip.

Objectives: To present a case of acquired cleft lip secondary to chronic cocaine abuse and to review relevant literature. To discuss surgical reconstruction with a modified Millard technique and its challenges and limitations. **Study Design:** Case report. **Methods:** The patient's single institution electronic medical record was reviewed regarding his cleft lip deformity and repair. The national PubMed database was queried for publications related to cocaine induced midface defects and their reconstruction. **Results:** A 52 year old man presented with a deformity of the lip and nasal sill, septal perforation, and hard palate fistula secondary to 30 years of chronic cocaine use. After a period of cocaine abstinence for 2 months, the patient underwent lip reconstruction using a modified Millard technique. Postoperatively, the patient benefited from a favorable cosmetic outcome but developed a slightly ptotic nasal tip and a fistula of the nasal cavity and gingivobuccal sulcus. These findings remained stable seven years after surgery. **Conclusions:** There are limited data describing surgical reconstruction of acquired cocaine induced midface defects, especially regarding the upper lip. We review the current literature and describe a case of viable reconstruction with the modified Millard technique, commonly used in pediatric congenital cleft lip repair.

27. Regenerative Implications of Priming Stimuli on the Peripheral Nervous System

Michael S. Chow, BS, Los Angeles, CA; Sanjana Ahsan, BA, Los Angeles, CA; Kyohei Itamura, BS, Los Angeles, CA; David D. Lam, BS, Los Angeles, CA; Joseph T. Rodgers, PhD, Los Angeles, CA; Amit Kochhar, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the clinical implications of priming stimuli in the peripheral nervous system and discuss the role of animal models in translational medicine.

Objectives: Explore the implications of priming stimuli on the peripheral nervous system through a mouse model. **Study Design:** Mouse dorsal root ganglia (DRG) were harvested to create an ex vivo model to quantify the initiation of peripheral nerve regeneration. Expanding on previous work from our lab, mice were exposed to a priming muscle injury 2 days prior to DRG harvest and compared to control non-injured mice. Initiation of neurite regeneration as well as total neurite length was quantified by time point fixation and immunocytochemistry. Hepatocyte growth factor activator (HGFA) was trialed as a systemic priming stimulus in lieu of muscle injury and compared to a sham treatment. The role of HGFA in neurite priming following injury was also evaluated by comparing injured HGFA genetic knockout mice and control non-injured knockout mice. **Methods:** At 24 hours mice exposed to priming injury had 61% of neurons initiate neurite outgrowth at

40.2 microns/hour compared to 31% of control mice at 10.5 microns/hour. Mice exposed to HGFA alone mirrored that of mice exposed to priming injury with 57.2% of neurons initiating neurite outgrowth at 58.2 microns/hour. In HGFA knockout mice, neither the priming injury nor control mounted an increased regenerative response with 32% and 34% of neurons initiating outgrowth respectively. **Results:** At 24 hours mice exposed to priming injury had 61% of neurons initiate neurite outgrowth at 40.2 microns/hour compared to 31% of control mice at 10.5 microns/hour. Mice exposed to HGFA alone mirrored that of mice exposed to priming injury with 57.2% of neurons initiating neurite outgrowth at 58.2 microns/hour. In HGFA knockout mice, neither the priming injury nor control mounted an increased regenerative response with 32% and 34% of neurons initiating outgrowth respectively. **Conclusions:** Peripheral neurons display a robust increase in growth in a stem progenitor cell model when exposed to priming injury or primed with an exogenous substance. This suggests that priming neurons for regenerative response in scenarios of anticipated peripheral nerve compromise may lead to improved clinical outcomes.

28. Rate and Factors Associated with Change in Surgeon for Revision Septorhinoplasty

Kayva Crawford, MD, San Diego, CA; Bharat Panuganti, MD, San Diego, CA; Brittany N. Burton, MHS MAS, San Diego, CA; Aria Jafari, MD, San Diego, CA; Deborah Watson, MD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discern the rate of and factors associated with patients changing surgeons for revision septorhinoplasty using a large population database.

Objectives: A subset of patients who require revision septorhinoplasty will change surgeons for their revision procedures. We sought to investigate the incidence of and clinicodemographic features associated with this tendency using a population-based, ambulatory surgery database. **Study Design:** A retrospective cohort analysis of adult patients who underwent at least one revision, or secondary, septorhinoplasty procedure between 2005 and 2011 with clinicodemographic information recorded in the Healthcare Cost and Utilization Project's California State Ambulatory Surgery and Services Database was performed. **Methods:** Multiple variable logistic regression analysis was used to identify characteristics predictive of surgeon change, which was defined by facility change for either the first and/or second revision procedure(s). Patients who underwent only a septoplasty, and not a primary septorhinoplasty, as their index procedure, were separately analyzed and compared. **Results:** A total of 2419 patients who underwent either a septoplasty (n=860) or septorhinoplasty (n=1559) as a primary procedure, and a subsequent septorhinoplasty were studied. The incidence of surgeon change was significantly higher for patients who underwent index septoplasty (44.8%) versus primary septorhinoplasty (30.5%) [95% CI 10.27, 18.32]. Traumatic nasal deformity (OR 0.58, [0.459-0.727]), Medicaid insurance status (OR 0.43, [0.2667 - 0.70499]), and nasal tip work (OR 0.49, [0.29-0.83]) were associated with lower odds of surgeon change among patients undergoing revision septorhinoplasty; male sex (OR 1.29, [1.03-1.63]) and private insurance status (OR 1.64, [1.32-2.06]) were associated with higher odds. **Conclusions:** Approximately one-third of patients change surgeons for revision septorhinoplasty. Discerning predictors of this phenomenon may improve patient retention and outcomes.

29. Delayed Facial Palsy Associated with Polytetrafluoroethylene Granuloma: A Late Consequence of Microvascular Decompression

Adeeb Derakhshan, MD, Boston, MA; Jenny X. Chen, MD, Boston, MA; Jacqueline J. Greene, MD, Boston, MA; Nate Jowett, MD, Boston, MA; Tessa A. Hadlock, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should understand that polytetrafluoroethylene (ie Teflon) granuloma should be considered in the differential diagnosis for patients presenting with facial weakness and a remote history of microvascular decompression for hemifacial spasm.

Objectives: Surgical management of hemifacial spasm (HFS) involves microvascular decompression (MVD) of the facial nerve by an offending vessel in the posterior cranial fossa. Polytetrafluoroethylene pledgets are implanted to prevent contact between the vessel and nerve. Rarely, the material incites a giant cell foreign body reaction. Here we present five cases in which formation of PTFE granuloma following MVD resulted in significant facial nerve weakness. **Study Design:** Retrospective case series. **Methods:** A database repository of approximately 4,000 patients presenting at a tertiary care facial nerve center was reviewed to identify individuals with new onset facial nerve weakness in the setting of previous MVD for HFS. Data collected include date of initial MVD surgery, date of presentation with recurrent facial nerve symptoms, presence of confirmatory imaging, and interventions undertaken. **Results:** Five patients were identified with new onset facial palsy following previous MVD of the facial nerve. The time between initial MVD and subsequent presentation with facial nerve weakness ranged from 17-35 years. All patients had imaging studies (MRI or CT) consistent with granuloma formation at the site of previous surgical intervention. Procedures performed to address new facial nerve symptoms included eyelid weight placement (n=2), tensor fascia lata static suspensions (n=2), tarsorrhaphy (n=1), temporalis muscle transfer (n=1), and 5-7 nerve transfer (n=1). **Conclusions:** The formation of a PTFE granuloma should be considered in the differential diagnosis for patients presenting with new onset facial weakness with previous history of microvascular decompression for hemifacial spasm. While ultimately irreversible, early diagnosis may lead to effective dynamic reinnervation before permanent muscle atrophy.

30. Role of Mobile Health on Patient Enrollment for Cleft Lip Palate Surgery: A Comparative Study Using SMS Blast Text Messaging in Zimbabwe

Shekhar K. Gadkaree, MD, Boston, MA; Jennifer C. Fuller, MD, Boston, MA; Travis T. Tollefson, MD, Sacramento, CA; Faith C. Muchemwa, MBChB PhD, Harare, Zimbabwe; Aleck Gonga, MBChB, Harare, Zimbabwe; David A. Shaye, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of SMS text messaging in the dissemination of information regarding cleft lip and palate surgery and the efficacy of SMS blast text messaging in global health.

Objectives: Patients' lack of awareness of available services is a significant barrier to delivering surgical care in resource limited settings. SMS text messaging is a potential means to disseminate this information in resource limited settings, where rates of mobile phone usage are high. In this study, we aimed to assess the efficacy of a short message system (SMS) text messaging platform to inform a Zimbabwean population of available cleft lip palate surgical services. **Study Design:** Retrospective cohort study. **Methods:** A blast SMS text informing local populations of upcoming cleft lip palate (CLP) surgical services was distributed to 25% of the subscriber base one week prior to arrival of a (CLP) surgical team in Zimbabwe. A retrospective cohort analysis comparing characteristics of patients presenting to the CLP clinic in the year prior to (2016) and two years following (2017-2018) the implementation of the blast SMS text messaging system is performed to assess its impact. **Results:** Patients presenting to Zimbabwean CLP surgical program in the years when SMS messaging notifications were in effect were significantly more likely (52 (64%) vs. 5 (17%), p<0.001) to have been informed of surgical services through their mobile phones. The average distance traveled per patient was not significantly different prior to implementation of mass text messaging (180.4 km (SD114.8) vs. 167.4 km (SD105.9), p=0.580). The average patient age was significantly higher following the implementation of mass text messaging (7.4 (SD8.7) vs. 3.0 (SD2.8) years, p=0.002). **Conclusions:** SMS messaging is an effective method of informing patients of cleft lip palate surgical services in resource limited settings. However, SMS text messaging did not significantly affect the distance patients traveled to obtain services.

31. Assessing Patient Satisfaction in Hair Restoration Surgery: Opportunities to Improve

Amir A. Hakimi, BS, North Chicago, IL; Jonathan P. Yasmeh, MS, Los Angeles, CA; Benjamin D. Boodaie, BS, New York, NY; David S. Foulad, MD, Loma Linda, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate patterns in online ratings of hair restoration surgeons and recognize opportunities to increase patient satisfaction and online reputation.

Objectives: Assess the impact of residency training background (surgical versus nonsurgical) of hair restoration surgeons on patient satisfaction, and identify themes of patient satisfaction or dissatisfaction with hair restoration surgeons using online physician reviews. **Study Design:** Retrospective analysis of Yelp.com and Healthgrades.com physician reviews written before July 18, 2018. **Methods:** 86 surgeons certified by the American Board of Hair Restoration Surgery (ABHRS) were identified using the ABHRS physician portal. Reviews from Yelp.com and Healthgrades.com with one or five star ratings were analyzed for content. The common themes that were identified from the reviews included procedure results, bedside manner, honesty, office staff, scheduling, cost, and recovery. ABHRS members were categorized into two groups based upon their residency training: surgical residencies versus nonsurgical residencies. Ratings were compared between these groups using student t-test with statistical significance assigned to P values less than 0.05. **Results:** Eleven different residency training backgrounds are represented. Analysis of physician ratings in surgical versus nonsurgical residency backgrounds did not demonstrate statistically significant differences for Healthgrades (4.78 versus 4.10, p = 0.14) or for Yelp (4.08 versus 4.30, p = 0.42). 567 five star reviews were analyzed for content across both physician review portals. The most commonly cited theme mentioned in five star reviews was procedure results (65.1%) followed by office staff (56.2%). 59 one star reviews were analyzed for content using identical themes. The most common reason for a one star review was procedure results (32.2%) followed by office staff (28.8%). **Conclusions:** Training from a surgical residency did not confer significant advantages in ratings by patients. Understanding drivers of positive and negative reviews may help surgeons improve patient satisfaction.

32. Economic Impact of a Facial Plastic and Reconstructive Surgeon: The Case Mix Index

Nikolaus S. Hjelm, MD, Philadelphia, PA; Akshay Sanan, MD, Stanford, CA; Howard D. Krein, MD PHD, Philadelphia, PA; Ryan N. Heffelfinger, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand the economic impact of FPRS admissions within a tertiary care center; and 2) compare Medicare reimbursement of FPRS admissions to general otolaryngology admissions.

Objectives: To determine the economic impact of FPRS admissions. **Study Design:** Retrospective chart review. **Methods:** In a retrospective review we analyzed the admissions of facial plastic and reconstructive surgeons as well as

general otolaryngologists at a tertiary medical center from October 2015 through May 2018. General otolaryngologists included any admissions by non-FPRS surgeons (excluding pediatrics). Of the FPRS admissions, there were no patients included that were admitted for oncologic resection or surgeries that would have fallen within other specialties of otolaryngology. The case mix index was then calculated for each admission. **Results:** There were two facial plastic and reconstructive surgeons and thirteen general otolaryngology surgeons who admitted patients from October 2015 through May 2018. A total of 103 admissions were found to have plastics only intervention. The average CMI for these patients was 2.92. Of the 1,918 general otolaryngology admissions, the average CMI was 2.62. **Conclusions:** At the studied tertiary care center, CMI values greater than a value of 2.2 indicated that the average Medicare reimbursements per admission surpassed the costs of the admission. The result is a profit for the hospital. As demonstrated in our study, FPRS admissions consistently produced a profit for this tertiary medical center. Furthermore, FPRS admissions resulted in a greater average CMI as compared to admissions under general (non-FPRS) otolaryngologists.

33. Electrochemolysis of Human Adipose Tissue

Dana M. Hutchison, MS, Irvine, CA; Melissa Bircan, Irvine, CA; Tiffany T. Pham, MS, Irvine, CA; Yueqiao Qu, PhD, Irvine, CA; Mark R. Kobayashi, MD, Irvine, CA; Brian J.F. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, participants should be able to describe the electrolysis reaction generated by electrochemolysis (ECL) and discuss its potential to selectively damage human adipose tissue.

Objectives: The number of patients seeking nonsurgical and minimally invasive means of fat reduction has grown dramatically over the last decade. ECL induces localized generation of hydroxide and hydrogen ions, adipocyte disrupting agents, through hydrolysis. We aim to investigate the potential of ECL to induce acid base injury in human adipose tissue and identify dosimetry parameters for possible adipose reduction. **Study Design:** Ex vivo human tissue study. **Methods:** Samples of discarded human adipose tissue following panniculectomy procedures were cut into small sections. Two needle electrodes were inserted into composite specimens tumesced with normal saline solution. ECL was applied at 3-6 volts (V) exposed over 5 minutes. Specimens were hemisectioned and stained with pH sensitive dye to obtain spatial pH distribution maps as a function of dosimetry. Samples were evaluated utilizing conventional histology methods. **Results:** The spatial extent of acid base perturbation was obtained as a function of dosimetry. Specimens were evaluated by histology and light microscopy showing localized cell membrane injury and lipolysis varying appropriately with dosimetry. **Conclusions:** ECL at the studied dosimetry parameters induced acid and base changes in human adipose tissue, suggesting its potential use in nonsurgical fat reduction and an ultra low cost method to replace pharmacologic methods of fat reduction, such as injectable deoxycholic acid. Further studies are needed to assess the functional state of adipocytes.

34. Correlating Gene Methylation and MicroRNA Function in Keloid Pathogenesis

Joanna Kam, MD, Detroit, MI; Laura Garcia-Rodriguez, MD, Detroit, MI; Indrani Datta, MS, Detroit, MI; George Divine, PhD, Detroit, MI; Maria J. Worsham, PhD, Detroit, MI; Lamont R. Jones, MD MBA, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss the impact of methylation on coding and noncoding gene function; and 2) discuss miRNA function and its role in the pathogenesis of keloids.

Objectives: In preliminary work, 5 differentially methylated miRNAs between keloid and matched normal skin tissue were identified. The 5 miRNAs were associated with target 12 genes in IPA knowledge base. The objective of the study was to assess miRNA function in keloid pathogenesis by correlating methylation with miRNA and target gene expression. **Study Design:** Prospective cohort. **Methods:** Sixteen primary, untreated, fresh keloid and matched normal skin samples were previously analyzed using the Infinnium Methylation EPIC Chip®. There were 2 pairs of duplicate samples from one patient, which was resolved by averaging the intensities for each pair, giving 15 paired samples for analysis. Gene expression from the same fifteen subjects was quantified using Thermo Fisher Advanced TaqMan® miRNA assays. Paired t-tests were performed to compare average expression between keloid and normal samples. **Results:** One miRNA gene (miR-203-3p) was expressed at a lower level in keloid tissue than normal tissue (p=0.007). Three coding genes were differentially expressed between keloid and normal tissue. AFF3 (p=0.015) and RUNX2 (p=0.002) were overexpressed in keloid tissue, while TP63 (p=0.039) was underexpressed. However, there was no correlation between microRNA expression and that of their target genes. **Conclusions:** Of the 12 target genes associated with differentially methylated microRNAs, 3 (AFF3, RUNX2, TP63) were differentially expressed between keloid and normal tissue. However, there was no significant correlation between miRNA expression and that of their target genes. In addition, methylation status did not reliably predict microRNA expression. Nevertheless, differential noncoding gene, miRNA, methylation may be a marker for coding genes important in keloid pathogenesis, warranting further investigation.

35. Simultaneous Maxillary and Mandibular Reconstruction with a Single Osteocutaneous Fibular Free Flap: A Case Series

Natalie A. Krane, MD, Portland, OR; Adam P. Fagin, DMD MD, Portland, OR; Tamer A. Ghanem, MD PhD, Detroit, MI; Steven B. Cannady, MD, Philadelphia, PA; Daniel I. Petrisor, DMD MD, Portland, OR; Mark K. Wax, MD, Portland, OR

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss options for complex maxillary and mandibular defect reconstruction and will be versed on an approach to reconstruct these defects simultaneously with a single osteocutaneous fibular free flap.

Objectives: To report and discuss an option for simultaneous reconstruction of a maxillary and mandibular defect with a single osteocutaneous fibular free flap with rehabilitative options. **Study Design:** Case series. **Methods:** We present three cases of simultaneous reconstruction of maxillary and mandibular defects using a single osteocutaneous fibular free flap. We illustrate the case of a 16 year old male with a history of extensive facial trauma sustained in a boat propeller injury resulting in a large maxillary and mandibular defect status post three failed reconstructive surgeries, a 48 year old male presenting after a self-inflicted gunshot wound with a right mandibular body and inferior maxillary bone defect status post a failed reconstructive effort with a scapular free flap, and a 33 year old male with recurrent rhabdomyosarcoma of the right muscles of mastication. We desired to reconstruct these patients with a vascularized composite free flap to obturate the maxillary defect and restore alveolar bone for eventual dental rehabilitation. **Results:** A single osteocutaneous fibular free flap was used in all patients to reconstruct the bone of the maxilla and mandible using preoperative three dimensional planning when available. The skin paddle provided intraoral soft tissue coverage. Our most recent patient was able to undergo implantable dental rehabilitation. Postoperatively, the patients' free flaps were viable and masticatory function was restored. Intraoperative and postoperative photo documentation of the fibular free flap reconstructions is provided. **Conclusions:** A single osteocutaneous fibular free flap can successfully be utilized for simultaneous reconstruction of maxillary and mandibular defects and provide a means for rehabilitation with dental implants.

36. Facial Artery Musculomucosal Flap for Nasopharyngeal Reconstruction and Velopharyngeal Insufficiency

Elizabeth A. Mannino, BS, Norfolk, VA; Benjamin J. Rubinstein, MD, Norfolk, VA; Eric J. Dobratz, MD, Norfolk, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the technique and novel indications (nasopharyngeal stenosis and velopharyngeal insufficiency) of the FAMM flap.

Objectives: The facial artery musculomucosal flap (FAMM) is a well vascularized axial flap which has been described for mucosal reconstructions throughout the oral cavity. There is limited data regarding its efficacy in repair of nasopharyngeal stenosis and velopharyngeal insufficiency. This study seeks to demonstrate the efficacy of FAMM flap procedure in patients with these indications. **Study Design:** A retrospective case series included patients treated for nasopharyngeal stenosis or velopharyngeal insufficiency with a FAMM flap at an academic medical center from January 1, 2012 to November 1, 2017. **Methods:** Functional outcomes of these patients were assessed, including nasopharyngeal airway patency, nasal regurgitation, and speech quality. Any postoperative complications were recorded, including flap necrosis, infection, flap failure, and need for revision surgery. **Results:** A total of 16 patients underwent the FAMM flap procedure by the senior author. Five of the 16 patients (31%) underwent the FAMM flap procedure for the indications of this case series. Two patients had nasopharyngeal stenosis and both had successful, sustained nasopharyngeal airway patency. Three patients had velopharyngeal insufficiency caused by a soft palatal defect, and all had restored velopharyngeal functions without obstructive complications. None of these patients experienced postoperative complications, flap failure, or need for revision surgery. **Conclusions:** The FAMM flap is useful for reconstruction of nasopharyngeal stenosis and velopharyngeal insufficiency. This versatile flap provides adequate bulk and mucosal surfacing during pharyngoplasty, often in a scarred field. The absence of postoperative complications is a testament to the reliability of the FAMM flap.

37. Comparison of Outpatient vs. Inpatient Orbital Fracture Repair: A NSQIP Analysis

Parsa P. Salehi, MD, New Haven, CT; Sina J. Torabi, BA, New Haven, CT; Yan H. Lee, MD, New Haven, CT

Educational Objective: At the conclusion of this presentation, the participants should be able to appropriately consider the benefit of outpatient orbital fracture repair surgery in select patients with the following goal: reducing healthcare costs and increasing patient satisfaction, without adversely impacting patient outcomes.

Objectives: Evaluate the incidence of postoperative complications in orbital fracture repair and assess the safety of performing these surgeries on an outpatient basis. **Study Design:** Retrospective analysis of orbital fracture repairs in the National Surgical Quality Improvement Program database. **Methods:** We assessed the difference in postoperative complications before and after propensity score matching on preoperative variables, as well as operative time, which was used as a proxy for intraoperative complications. Predictors of complications were obtained via a binary logistic regression. **Results:** A total of 529 (57.2%) inpatient cases and 396 (42.8%) outpatient cases were included. Before matching,

inpatients were more likely to be older, have higher ASA classifications, and have other comorbidities. Postoperatively these patients were more likely to experience complications, like readmission and reoperation. After matching, our analysis showed no difference in complications between the cohorts. Only three variables predicted complications: ASA class 4, long operative time, and preoperative sepsis/SIRS. **Conclusions:** Outpatient orbital fracture repair may be safe in select patients. Overall, orbital fracture repairs have low morbidity/mortality. While inpatient cases were more likely to experience a complication postoperatively, these patients also tended to be sicker. However, once matched, there was no statistically significant difference between complications in inpatient and outpatient cohorts. In fact, only three evaluated factors were linked to a greater likelihood of complications. This suggests that patients without the aforementioned factors should be appropriately considered for outpatient surgery. Increasing the proportion of outpatient cases may decrease healthcare costs and increase patient satisfaction. Nevertheless, higher surveillance of these patients post-discharge may be prudent.

38. Postoperative Pain and Opioid Need after Facial Mohs Defect Reconstruction

Arron M. Cole, MD, New York, NY; Anthony P. Sclafani, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the level of pain and the need for and amount of postoperative opioid prescription after reconstruction of defects after Mohs excision of facial skin cancers.

Objectives: To assess the level and temporal course of pain as well as to assess the amount of opioid used by the average patient after reconstruction of Mohs facial defects. **Study Design:** Prospective, observational case series. **Methods:** Patients undergoing reconstruction of Mohs facial defects were prospectively enrolled between September 2017 and September 2018. Patients completed demographic and psychological (anxiety and depression and pain catastrophizing) screening tests and were provided with pain assessment questionnaires before surgery. After surgery by a single surgeon, patients received a small number of opioid medication (oxycodone/acetaminophen, 5/325mg, 7.5 morphine milligram equivalents) pills for postoperative pain at the discretion of the surgeon (range 6-20 pills). Patients documented peak pain levels on a visual analogue scale, as well as daily narcotic and nonnarcotic medication use for the first 14 days after surgery. **Results:** Twenty patients were enrolled, and 18 patients completed all forms and were included for review. All patients underwent reconstruction with local advancement, rotation or transposition flaps; no musculocutaneous or forehead flaps were used. Most patients reported no worse than moderate pain after repair of facial Mohs defects, although one patient recorded a pain level of 83/100 on the day of surgery. One patient experienced prolonged pain (33/100 on POD 14) and required control of pain with opioids through the duration of the study; otherwise, patients ceased opioid use after POD 4. Maximum average pain recorded by patients was 57/100 on the VAS scale and occurred on postoperative day #0. **Conclusions:** Although seemingly simple procedures, pain after reconstruction of Mohs defects of the face, generally mild, may persist for the first few days after surgery and require a limited amount of postoperative opioids for adequate pain control. Prolonged pain, although uncommon, can occur and adequate pain control should be assured in all patients.

39. Optical Coherence Tomography Imaging of the Internal Nasal Valve during Inspiration: Correlation of Cross-Sectional Area and Intranasal Pressure

Giriraj K. Sharma, MD, Irvine, CA; Tuan Ngo, BS, Irvine, CA; Christopher Badger, BS, Irvine, CA;
Prem B. Tripathi, MD MPH, Irvine, CA; Zhongping Chen, PhD, Irvine, CA; Brian J.F. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand a novel means to optically image and sense pressure within the internal nasal valve under dynamic airflow.

Objectives: Long range optical coherence tomography (LR-OCT) has been previously described as a useful imaging tool to quantify the native geometry of the internal nasal valve (INV). Our objectives were to use LR-OCT to measure the INV cross-sectional area (CSA) during normal respiration and inspiration and to correlate CSA measurements with intraluminal pressure. **Study Design:** Prospective clinical trial. **Methods:** An Arduino pressure sensor was constructed and calibrated using a limiter controlled vacuum system and industrial absolute pressure gauge. LR-OCT imaging and pressure transduction were performed concurrently in the naris in 8 healthy adult subjects during normal respiration and forced inspiration. The CSA was measured and correlated with pressure at the INV. **Results:** The pressure sensor and reference pressure gauge outputs were correlated with a linear regression model (R2 0.999). Mean CSA during normal respiration and inhalation were 11.69 mm2 and 6.49 mm2 respectively. The mean change in pressure between normal respiration and forceful inhalation was 12.27 mmHg. CSA was correlated with pressure (mmHg) with a mean Pearson correlation coefficient (r) of 0.912. **Conclusions:** LR-OCT imaging and concurrent pressure sensing is a useful way to quantify dynamic behavior of the INV. Our results demonstrate a significant correlation between INV geometry and nasal airflow during inspiration cycles.

40. Safety and Efficacy of MRI Scanning in Patients with Implanted Microvascular Coupling Devices

William W. Thomas, MD, Portland, OR; Neelam Phalke, MD, Baton Rouge, LA; James Azzi, MD, Portland, OR; Ryan J. Li, MD, Portland, OR; Daniel Petrisor, DMD MD, Portland, OR; Mark K. Wax, MD, Portland, OR

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the feasibility of MRI functionality in patients with implanted microvascular coupler devices.

Objectives: To demonstrate the safety and compatibility of microvascular couplers in patients undergoing postoperative MRI scans. **Study Design:** Retrospective case series. **Methods:** A consecutive review of 1252 patients undergoing free tissue transfer for head and neck reconstruction at our institution between 2010-2017 who had microvascular coupler, Synovis, implantation and subsequent MRI scanning. MRI scanning consisted of a variety of Philips MRI machines ranging from 1.0 - 3.0 tesla in magnetic strength. **Results:** 101 patients underwent 115 free flaps with 131 couplers utilized for venous anastomoses, 32 being flow couplers. Couplers ranged in size from 1.5 to 4.0 mm (3.0mm (42%) 3.5 mm (21%) and 2.5 mm (19%) were the predominant sizes). 359 MRI scans (2 days to 91 months postoperatively) were obtained with 233 MRIs for local/regional cancer surveillance and the remaining for neurologic disease, injury or evaluation for distant metastases. No complications related to the MRI and the metallic components of the coupler or other metal implants, such as reconstruction bars, vascular clips or metallic surgical mesh occurred. No radiology report commented upon MRI distortion due to the coupler placement. **Conclusions:** Microvascular couplers and their constitutive stainless steel pins have not been found to cause any complications in a large series of consecutive patients undergoing multiple MRIs with magnetic strength up to 3 tesla. While the FDA advocates medical alert notification for patients with couplers; MRI scanning for surveillance or otherwise is safe.

41. Incidence of Delayed Surgery and Predicting Factors for Adverse Events in Elective Maxillofacial Fracture Repair

Sina J. Torabi, BA, New Haven, CT; Jonathan M. Avery, BS, New Haven, CT; Parsa P. Salehi, MD, New Haven, CT; Yan H. Lee, MD, New Haven, CT

Educational Objective: At the conclusion of this presentation, the participants should be able to identify predicting factors for delayed surgery and adverse event in elective maxillofacial fracture repair, and thus be able to better select patients for elective repair and ultimately reduce unnecessary healthcare costs.

Objectives: In patients undergoing elective maxillofacial fracture repair we sought to define 1) factors predicting delay in surgery; 2) factors predicting adverse events; and 3) surgical complications stratified by delay in surgery, with the goal of identifying unnecessary surgical delays. **Study Design:** Retrospective analysis of elective maxillofacial fracture patients from 2008-2016 NSQIP. **Methods:** After patient identification, delayed surgery was defined as patients with = / > 1 day from admission to operation. Univariate analyses were performed to assess the difference in the rate of demographics and postoperative complications between those who did and did not have a delayed surgery. Using a binary logistic regression, we obtained predictors of delayed surgery and predictors of any adverse event (AAE). By comparing the two regressions, we examined the concordance between predictors of surgical delay and of AAE. **Results:** 105 patients (4.44%) had delayed surgery. Predictors for delay included alveolar ridge/mandibular fracture ($p< 0.001$), open wound ($p< 0.001$), COPD ($p= 0.003$), and sepsis/SIRS ($p=0.024$). AAE predictors included alveolar ridge/mandibular fracture ($p= 0.017$), open wound ($p= 0.034$), sepsis/sirs ($p< 0.024$), but not COPD ($p= 0.300$). Univariate analysis identified that delayed surgery was not a significant predictor of AAE ($p= 0.075$) but was a predictor of hospital stay length postsurgery ($p= 0.001$). **Conclusions:** AAE was not correlated to delay in surgery. This finding suggests that physicians are using the appropriate criteria to admit patients and delay surgery for optimal patient outcomes. This implies that the increased healthcare cost derived from the longer hospital stay is justified and not overutilized in these cases.

42. Venous Flow Coupler in Head and Neck Free Flap Reconstruction

Scott H. Troob, MD, New York, NY; Quinn Self, MD, Burlington, VT (Presenter); James Azzi, MD, Palm Beach, FL; William W. Thomas, MD, Portland, OR; Daniel I. Petrisor, MD DDS, Portland, OR; Mark K. Wax, MD, Portland, OR

Educational Objective: At the conclusion of this presentation the participants should be able to determine the value of the flow coupler in monitoring free flaps, compare the detection rate of flap compromise with the flow coupler, compare single vein vs double vein monitoring of the flap.

Objectives: Acute flap compromise in the immediate postoperative setting can be salvaged in the majority of cases if detected early, with prompt return to the operating room. The flow coupler monitors venous flow coming out of the flap. In combination with physical exam it may allow for the early detection of flap compromise. We describe its utility in monitoring flaps in the immediate postoperative setting. **Study Design:** Retrospective case series. **Methods:** Free flap reconstructions in which venous flow couplers were employed to supplement flap monitoring were analyzed. All free flap cases performed over the past four years were reviewed. Inclusion criteria were flow coupler and arterial Doppler monitored for five days postop. **Results:** From June 2014 through April 2018, the flow coupler was used in combination with the arterial

Doppler and clinical monitoring in 231 cases. 18 cases did not meet criteria for inclusion, thus 213 cases were analyzed. 20 cases (8.7%) returned to the operating room with concern for flap compromise and 16 were salvaged. The combination of flow coupler and arterial Doppler identified 19 of these flaps. Flow couplers identified 4 compromised flaps before there was an arterial signal change and all were salvaged. Additionally, there was a 24.1% FPR when two flow couplers were used in parallel. **Conclusions:** The flow coupler identified compromised free flap anastomoses prior to arterial compromise in a small number of cases but resulted in successful salvage operations. The use of multiple concurrent venous flow couplers demonstrated a high rate of clinically nonsignificant signal loss.

43. Anatomic Optical Coherence Tomography (aOCT) for Evaluation of the Internal Nasal Valve: A Cadaveric Study

Candace Mitchell Waters, MD, Chapel Hill, NC; William W. Shockley, MD, Chapel Hill, NC; J. Madison Clark, MD FACS, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe aOCT and its application to the nasal valve; and 2) understand the static changes that accompany placement of a butterfly graft and spreader grafts for nasal valve stenosis.

Objectives: To determine the fidelity of aOCT in evaluation of static changes within the internal nasal valve. **Study Design:** Anatomic cadaver study. **Methods:** Fresh harvested cadaveric heads were evaluated using both standard CT imaging as well as using aOCT technology. Scans were performed at 3 time points 1) after septoplasty for cartilage harvest; 2) after placement of a butterfly graft to widen the internal nasal valve; and 3) after placement of bilateral spreader grafts (butterfly grafts removed). **Results:** Scans using aOCT showed comparable results to CT imaging of the internal nasal valve in terms of overall volume and ability to detect change in internal valve diameter after placement of butterfly graft and spreader grafting. Flow rates obtained using computational flow dynamics (CFD) were similar between the two imaging modalities. In addition, aOCT imaging showed good internal reliability when scans were performed in the same head multiple times. **Conclusions:** The internal nasal valve can be imaged in a static fashion using aOCT technology. Advantages over traditional CT imaging include lack of exposure to radiation, rapid scan time, and the possibility of in-office use as the technology develops. Further investigations will show its potential role for dynamic evaluation of this vital component of the nasal airway.

44. Comparing Caliper versus CT Measurements of Cephalic Index in Children with Craniosynostosis

Grace T. Wu, MD, Syracuse, NY; Jason R. Audlin, MD, Syracuse, NY; Jeewanjot S. Grewal, BS, Syracuse, NY; Sherard A. Tatum, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe how accurate caliper measurements are compared to CT measurements of the cranial vault.

Objectives: Despite the prevalence of using surface anthropometric measurements to assess cranial vault growth after cranial vault reconstruction in craniosynostotic patients, there is no study assessing the accuracy of caliper measurements compared to 2D CT measurements. The objective of this study is to determine if clinicians can rely on caliper measurements to assess postoperative cranial vault growth in these patients. **Study Design:** Retrospective chart review. **Methods:** Patients with a diagnosis of craniosynostosis seen between the dates of 1/1/2010 to 1/1/2017 at one academic medical center were identified. Sixty-four patients were found who had preoperative CT head scans and Bertillon spreading caliper measurements of anterior posterior and transverse cranial dimensions. The means of the anterior posterior and transverse cranial dimensions as well as the cranial index were compared between the two techniques. A two tailed t-test was used to determine statistical significance. **Results:** The p values were 0.07 for the anterior posterior measurement, 0.04 for the transverse measurement, and 0.64 for the cranial index. The average caliper measurement of the transverse dimension was 0.5 cm greater than the average of the CT measurements. **Conclusions:** There is no statistical significance between the anterior posterior measurements or the cranial index, but there is statistical significance between the transverse measurements when comparing caliper versus CT measurements. The difference between the transverse measurements could represent a difference between clinical and radiographic euryon. However, the difference of only 0.5cm is small and unlikely to be clinically significant. Caliper measurements can be considered a reliable way to follow cranial vault growth after cranial vault reconstruction.

45. The Case of the Eyelid Silicone Granulomas

Jacqueline A. Wulu, MD, Boston, MA; Laura R. Garcia-Rodriguez, MD, Boston, MA; Jeffrey H. Spiegel, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the management of silicone granulomas.

Objectives: To demonstrate the importance of keeping foreign body granulomas on the differential for all patients with a history of facial dermal filler injections. **Study Design:** Case report. **Methods:** We present a case of a 48 year old male

who had presumed hyaluronic acid fillers injected into his upper and lower eyelids several years prior and later developed periorbital swelling which was initially investigated as a possible allergic reaction or autoimmune process. **Results:** A blepharoplasty was performed and histopathology confirmed that the patient had silicone granulomas of the upper and lower eyelid. **Conclusions:** This case illustrates the importance of keeping foreign body granulomas on the differential for all patients with a history of facial dermal filler injections.

46. Septorhinoplasty and Endoscopic Sinus Combination Surgery: Surgical Characteristics, Demographics, Charge, and OR Time Comparisons

Yanchen Zhang, BA, Los Angeles, CA; Amit Kochhar, MD, Los Angeles, CA; Laurel Fisher, PhD, Los Angeles, CA; Patrick Byrne, MD, Baltimore, MD; Stephanie Smith, MD, Chicago, IL; Elisabeth Ference, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the distribution of SRP+ESS combination surgeries amongst high, medium and low volume rhinoplasty surgeons. Participants should be able to discuss the relative advantages and disadvantages in performing SRP+ESS together vs separately.

Objectives: To study the characteristics associated with septorhinoplasty (SRP) with concurrent endoscopic sinus surgery (ESS). **Study Design:** Cross-sectional analysis. **Methods:** Current procedural terminology codes were evaluated for cases of SRP (13,562), ESS (101,097), and concurrent SRP with ESS (SRP+ESS) (993) within the State Ambulatory Surgery Database from 2009-2011. Patient demographics, surgeon volume, charge, and operating room (OR) time were compared. Surgeon volume analysis divided surgeons into terciles based on number of surgeries performed in one year. **Results:** Among the 993 SRP+ESS in our study, a majority involved nasal valve repair (56%), followed by primary rhinoplasty (41%). A small subset underwent revision rhinoplasty (3%). High volume rhinoplasty surgeons (ne27) performed more SRP+ESS than medium (7<n<27) and low volume rhinoplasty surgeons (nd7) (p =0.02). A majority of SRP+ESS involved two or fewer sinuses (66%). Mean OR time for SRP+ESS was 197.0 (± 4.9) min, almost 50 minutes shorter than if both were performed individually (143.5 (± 1.3) minutes for SRP alone and 103.9 (± 0.4) minutes for ESS alone). **Conclusions:** SRP+ESS more frequently involved fewer than two sinuses and was less likely to involve revision rhinoplasty. This may denote that these cases select for lower sinus disease burden and less complex rhinoplasty. SRP+ESS were also more likely to be performed by high volume rhinoplasty surgeons, suggesting that SRP+ESS were predominantly performed by facial plastic surgeons rather than general otolaryngologists. The combination of SRP+ESS was found to reduce the required OR time compared to each performed alone, thus reducing economic operative cost.

GENERAL

47. Socioeconomic Status and Otolaryngology Disease Factors on CPAP Compliance

Eric H. Abello, BS, Chicago, IL; Abdul Basit, MS, Chicago, IL; Alexandra C. Lastra, MD, Chicago, IL; Mahboobeh Mahdavinia, MD, Chicago, IL; Jill S. Jeffe, MD, Chicago, IL; Philip S. Losavio, MD, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to identify factors associated with CPAP compliance, identify patients at risk of noncompliance, and treat comorbid conditions to improve CPAP compliance rates.

Objectives: The purpose of this study was to investigate different factors associated with continuous positive airway pressure (CPAP) compliance. **Study Design:** Large retrospective cohort study of prospectively collected data on 578 patients with obstructive sleep apnea (OSA) on CPAP, at a large urban tertiary care center. **Methods:** A total of 578 OSA patients with mean age (±SD) of 58 (±15) and mean AHI (±SD) of 37.25 (±31.91) were enrolled. Logistic regression was performed to ascertain the effects of race and socioeconomic status on CPAP compliance while adjusting for OSA severity. We also analyzed the adjusted association of median income and self reported symptoms of sinus headaches, gastroesophageal acid reflux (GERD), and enlarged tonsils, on CPAP compliance. **Results:** CPAP compliance was associated with race, with African American patients being less compliant than their white counterparts (OR [95% CI]:0.42 [0.24 0.72], p<0.01). Severity of OSA was associated with compliance rates; those with mild disease (AHI 5-15) were less likely to be complaint than those with severe disease (AHI >30) (0.57[0.34 0.96], p<0.03). Self reported symptoms of sinus headaches, GERD, and enlarged tonsils were associated with significantly lower levels of compliance. Higher median income was positively associated with higher levels of compliance. Furthermore, when incomes were grouped based on federal classification brackets, there was a strong significant association between compliance and median income (p < .001). **Conclusions:** Compliance with CPAP is affected by patient socioeconomic status and race. There is a significant negative trend in compliance when patients present with GERD, enlarged tonsils, or sinus headaches. Identifying patients at risk for noncompliance and actively treating comorbid symptoms could be used to improve compliance to CPAP therapy.

48. Multicenter Validation of a Tracheostomy Care Teaching Program for Internal Medicine Residents
Ashwin Ananth, MD MBA, New Orleans, LA; Jeremy Barr, BS, New Orleans, LA; Gabriella Frisenda, BS, New Orleans, LA; Edward D. McCoul, MD MPH, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) explain the components of a tracheostomy care teaching program; 2) demonstrate proficiency in leading an educational presentation on tracheostomy care; and 3) discuss the utility of a validated tracheostomy care program in a university setting.

Objectives: This study aimed to evaluate the effectiveness and reproducibility of a standardized education program for general tracheostomy care. **Study Design:** Three independent cross-sectional questionnaires in three academic medical centers. **Methods:** This study is a multicenter validation study using materials from a previous tracheostomy education study. A 25 question multiple choice and true/false quiz was given to internal medicine residents who routinely provide care for patients with tracheostomies. This was followed by an educational module and the quiz was repeated. Participants were also asked to rate their level of comfort (0-100 point scale) managing a tracheostomy before and after the module. A 6 month followup assessment was also obtained. **Results:** A total of 135 internal medicine residents across three different training programs participated in the educational module. There was a significant increase in the percentage of correct answers from pre-quiz to post-quiz, as well as a significant increase in providers' comfort level. The increased comfort level was retained at 6 month followup. **Conclusions:** The educational module for general tracheostomy care published by Yelverton et. al. provides succinct and useful education on tracheostomy care. This results in increased knowledge and confidence for non-otolaryngology providers in managing patients with tracheostomies.

49. Upper Airway Stimulation Therapy and Sleep Architecture in Patients with Obstructive Sleep Apnea
Dominique Bohorquez, BA, Philadelphia, PA; Ahmad F. Mahmoud, MD, Philadelphia, PA; Jason L. Yu, MD, Philadelphia, PA; Erica R. Thaler, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the effects of upper airway stimulation on sleep architecture.

Objectives: To quantify changes in sleep architecture among patients with obstructive sleep apnea (OSA) before and after upper airway stimulation (UAS) implantation. **Study Design:** Retrospective chart review at a single institution tertiary academic care center. **Methods:** Sleep studies were performed for UAS implant recipients after implantation and compared to preoperative polysomnography. Primary outcomes included those pertaining to architecture such as N1, N2, N3, and REM duration as well as others. Secondary outcome measures included respiratory parameters as well as BMI. **Results:** Seventy-six patients underwent UAS implantation. Of these, 40 met inclusion criteria. There was improvement across all sleep architecture parameters, however, none were statistically significant. N1 sleep percent was 16.3% ± 1.9 preoperatively and decreased to 12.5% ± 2.2 postoperatively (p-value 0.054). N2 decreased from 61.1% ± 2.8 to 58.7% ± 2.6 (p-value 0.536), N3 increased from 10.3% ± 1.9 to 16.0% ± 2.7 (p-value 0.100), and REM decreased from 13.5% ± 1.5 to 12.7% ± 1.3 (p-value 0.772). In contrast, respiratory parameters showed significant improvement throughout the cohort. AHI was reduced from 39.5 ± 2.5 to 4.9 ± 1.6 (p-value 0.000), NOS increased from 76.9% ± 2.4 to 90.9% ± 0.5 (p-value 0.000). Similarly, percent of total sleep time spent below 88% oxyhemoglobin saturation was 9.6% ± 3.1 which decreased to 0.85% ± 0.66 (p-value 0.000). **Conclusions:** Following UAS implantation there was improvement in sleep architecture, however, this did not reach significance. This is in contrast to respiratory parameters which showed significant and profound improvement.

50. Where Do Nasal Mesenchymal-like Stem Cells Reside in vivo?
Rhea Choi, BA, Miami, FL; Michael A. Durante, BA, Miami, FL; Garrett M. Goss, BA, Miami, FL; Zukaa B. Sargi, MD, Miami, FL; Bradley J. Goldstein, MD PhD, Miami, FL

Educational Objective: At the conclusion of this presentation, participants should develop a better understanding of an MSC-like population found in the lamina propria of human nasal turbinate tissue.

Objectives: Mesenchymal stem cells (MSCs), classically isolated from bone marrow, are of broad interest to the regenerative medicine community. A human turbinate mesenchymal-like stem cell has been well studied, defined by its in vitro phenotype. Nonetheless, the identity in vivo of the cells that gives rise to nasal MSC-like cultures remains unclear. We aimed to define the in vivo phenotype of human nasal MSC-like cells. **Study Design:** Experimental basic science. **Methods:** Human turbinate tissue was dissociated into a live cell suspension and subjected to gene expression profiling using a single cell RNA sequencing approach. Via bioinformatic analysis, t distributed stochastic neighbor embedding (t-SNE), cells were clustered based on feature similarities. Analysis of transcript enrichment and comparison to known cell markers was used to assign phenotypes. Immunohistochemistry was performed to stain turbinate sections for selected markers. **Results:** Over 5000 single cells were sequenced, and t-SNE analysis assigned cell populations into clusters. While there is no single marker defining an MSC, we identified a population uniquely expressing transcripts characteristic of MSC cultures, including CD105, CD34, and Nestin, lacking expression of transcripts associated with respiratory epithelium. The expression of transcription factors such as Sox17, Ebf1, and Foxp1 suggests cells in the MSC-like cluster maintain

an ability to direct stem cell fates. Immunohistochemistry of human turbinate sections indicated that CD34, CD105, and Sox17 expression localized selectively to cells surrounding blood vessels in the turbinate lamina propria. **Conclusions:** Our findings provide evidence that the in vivo origin of nasal MSC-like cells is likely a vascular or pericyte population.

51. Assessing Clinical Practice Guideline Compliance for Evaluation and Management of Idiopathic Sudden Sensorineural Hearing Loss

Christopher O. DaSilva, BS, Chicago, IL; Benjamin D. Malkin, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, participants should be able to understand how the AAO-HNSF sudden hearing loss clinical practice guideline is affecting provider practice habits.

Objectives: The objective of this project was to assess the impact of the American Academy of Otolaryngology-Head and Neck Surgery Foundation's clinical practice guideline (CPG) on the evaluation and management of patients with idiopathic sudden sensorineural hearing loss (ISSNHL) in a multidisciplinary group practice. **Study Design:** Retrospective chart review. **Methods:** Patients referred to the head and neck surgery department for sudden hearing loss from January 2016 to December 2017 were included. Patient demographics, audiology reports and medical encounters were reviewed. Patients with known etiologies and/or no audiometric confirmation of hearing loss were excluded. Provider compliance with the recommendations of each of the 13 key action statements (KAS) was assessed. **Results:** Three hundred fifteen patients were referred and 76 met criteria for ISSNHL. The pure tone average was 20 and 44 dB HL in the unaffected and affected ears, respectively. Compliance with KAS 3-7 was >96%; 68% for KAS 10; and <50% for KAS 1 and 2. For the 2 KASs with evidence based statements of option , compliance was 81% for initial treatment with corticosteroids (KAS 8) and 0% for offering hyperbaric oxygen therapy (KAS 9). Compliance with KAS 11, 12 and 13 was 66%, 74%, and 69%, respectively, for patients who had incomplete recovery (n = 35). **Conclusions:** When evaluating and managing patients with ISSNHL, physicians can improve their compliance with CPG KASs 1, 2 and 10. For patients that have persistent symptoms, compliance with KAS 11 13 may also be improved.

52. Cytomegalovirus Legislation Update: Implications for Pediatric Hearing Loss Prevention

Yalda Dehghan, BA, La Jolla, CA; Sapideh Gilani, MD FACS, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding of the importance of the early detection of cytomegalovirus infection (CMV) in the prevention of hearing loss in children. The participants will understand the importance of screening for CMV in the newborn nursery.

Objectives: Cytomegalovirus (CMV) is the most common cause of pediatric sensorineural hearing loss. The objective is to familiarize participants with this infection and raise awareness of the infection and legislation that has been proposed in multiple states to test for the infection. **Study Design:** A systematic review of the literature will be presented. **Methods:** Embase, Cochrane Review, and PubMed articles relevant to CMV infection and its effect on pediatric sensorineural hearing loss will be presented. **Results:** CMV is a leading cause of pediatric sensorineural hearing loss. Early detection of the infection and early treatment helps prevent sensorineural hearing loss in children. **Conclusions:** Early detection and treatment of CMV may help reduce pediatric sensorineural hearing loss. Increasing awareness of the disease among otolaryngologists may help efforts to prevent pediatric sensorineural hearing loss.

53. Palliative Care in Head and Neck Squamous Cell Carcinoma: Are the Most Common Treatments Improving Survival?

Marcus L. Elias, BS, Newark, NJ; Joseph S. Weisberger, MS, Newark, NJ; Richard D. Bavier, BA, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard Chan Woo Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the advantages and disadvantages of palliative care treatments for HNSCC with respect to comfort and survival.

Objectives: To investigate how palliative treatment modalities affect survival in head and neck squamous cell carcinoma (HNSCC) patients. **Study Design:** Retrospective database review. **Methods:** The National Cancer Database (NCDB) was reviewed for all HNSCC diagnosed between 2005 and 2015 (n=401,781). There were 5,181 cases undergoing palliative care, with 856 of those cases consisting of solely pain management. Cases with palliative treatment, not including pain management cases or combinations with pain management, were analyzed (n=4,012). The effects of patient demographics and tumor characteristics on survival were assessed using Kaplan-Meier and Cox proportional hazards models. **Results:** Most HNSCC patients receiving palliative treatment other than pain management had stage IV malignancies (75.8%), followed by stage III (10.1%). The greatest proportion of palliative treatment involved radiation (41.5%), followed by surgery (29.0%), chemotherapy (21.8%), or a combination (7.7%). Compared to the 35.73 month mean survival for those undergoing pain management only, mean survival was greatest in the palliative surgery cohort (54.79m; $p<0.001$) followed by a combined approach (25.40m; $p=0.180$), chemotherapy (19.02m; $p=120$) and radiation (14.94m; $p<0.001$). Controlling for age, sex, race, tumor characteristics, tumor stage, and other significant covariates in the Cox proportional hazards models, radiation therapy was associated with poorer survival compared to all other treatments (haz-

ard ratio [HR]=1.863; p<0.001; CI [1.679-2.067]). Palliative surgery was an independent predictor of improved survival ([HR]=0.470; p<0.001; CI [0.417-0.531]) over all other treatment modalities. Chemotherapy ([HR]=1.108, p=0.087, CI [0.985-1.245]) and a combination approach ([HR]=0.859, p=0.112, CI [0.709-1.041]) did not significantly predict variations in survival. **Conclusions:** The main goal of palliative care is to improve patient comfort. If ancillary benefits of extended survival are desired, the choice in modality can significantly alter clinical management.

54. High Volume Surgeons Have Lower Complication Rates for Thyroidectomy

Antoinette R. Esce, BA, Rochester, NY; Paul D. Allen, PhD, Rochester, NY; Alexis M. Strohl, MD, Rochester, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how hospital and surgeon volumes affect patient outcomes and what additional research is needed in the area.

Objectives: Although the positive volume outcome relationship in surgery has been well documented in the literature, there has been more limited investigation into the nature of this relationship in otolaryngology. This study investigated how annual hospital and surgeon volumes influenced complication rates in patients undergoing thyroidectomy for malignant disease. **Study Design:** All patients undergoing total or partial thyroidectomy for malignant thyroid disease between 2000 and 2015 were identified from the New York Statewide Planning and Research Cooperative System (SPARCS) database. International disease classification (ICD-9) codes were used to identify specific complications. **Methods:** Proportional Cox hazard ratios and logistic regression, using volume as a continuous variable, were used to compare survival and complication rates, respectively. **Results:** A total of 32,746 patients were included in the analysis. Patients treated at high volume hospitals or by high volume surgeons had greater Charlson comorbidity indices and were more likely to have metastatic disease (p<0.01). Both hospital and surgeon volume were independently associated with improved survival and lower rates of severe parathyroid injury (p<0.01). Only surgeon volume was independently associated with lower risk of recurrent laryngeal nerve injury (OR=0.85 [CI 0.77 - 0.94], p<0.01). **Conclusions:** Both high volume hospitals and surgeons appear to have better outcomes when surgically managing malignant thyroid disease, despite caring for sicker patients. However, only annual surgeon volume was independently associated with reduced risk of recurrent laryngeal nerve injury. Further research is needed to understand the nuance of the volume outcome relationship in head and neck surgery.

55. The Role of Safety Net Hospitals in Otolaryngology Residency

Annie N. Farrell, BS, Atlanta, GA; Charles E. Moore, MD, Atlanta, GA; Anita B. Sethna, MD, Atlanta, GA; Oswaldo A. Henriquez, MD, Atlanta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the significance of safety net hospitals in otolaryngology residency education.

Objectives: Safety net hospitals (SNHs) have a significant importance in our country, serving low income patients who are often socially and medically vulnerable. A high percentage of SNHs have a role in physician education, but the impact SNHs have in resident education has yet to be fully defined. The objective of this study was to further clarify the role SNHs have in otolaryngology residency training. **Study Design:** Cross-sectional survey. **Methods:** IRB approved surveys distributed via email to otolaryngology residency program directors (PDs). Demographic data, program training characteristics, and specific opinions were recorded using descriptive statistics. **Results:** Of 108 residency programs contacted, we received responses from 38 PDs (35.2% response rate). Responses represented training programs from all regions in US (21% NE, 32% SE, 29% MW, 18% W). 39.5% of represented programs had 4 or more residents per training year. 73.7% were associated with a SNH. Of programs associated with a SNH, PGY2 and PGY5 residents spent the largest amount of time at the SNH, an average of 6 months each. Of full time faculty at SNHs, 22.0% were volunteer community otolaryngologists, 9.5% were clinical instructors, 30.8% were assistant professors, 17.9% were associate professors, and 19.8% were professors. When asked how important PDs thought the training at a SNH was for resident training (on a scale of 1-5, with 5 being very important), an average of 3.8 was obtained from 33 PDs. **Conclusions:** The impact of otolaryngology training in SNHs is significant in the view of polled program directors.

56. Electronic Consults (eConsults) in Otolaryngology: A Retrospective Review of Use, Content, and Outcomes in an Academic Health System

Sapideh Gilani, MD, San Diego, CA; Krishna K. Bommakanti, BA, San Diego, CA (Presenter)

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role played by eConsults in otolaryngology.

Objectives: 1) Categorize the primary reasons for eConsults to otolaryngology from primary care physicians; 2) determine how many patients avoided subsequent otolaryngology clinic visits. **Study Design:** Retrospective analysis of data collected from our department of otolaryngology. **Methods:** This is a retrospective analysis of 69 patients seen within our healthcare system with complaints for which an eConsult to ear, nose, and throat (ENT) was placed by primary care physicians. The complaints were categorized as 1) ear, 2) nose, 3) throat, and 4) neck. Univariate statistics and binary

logistic regression were used to analyze the association of problem type with the need for followup in ENT clinic. The data was adjusted for age and gender. **Results:** The study population included 69 patients (average age 54.59 years, 59.4% male). Within this group, 40.6% of consults were for ear concerns, 14.5% for nose concerns, 27.5% had throat related complaints, and 17.4% had neck related complaints. Of the 69 eConsults received, 77.9% did not require an in person followup with ENT clinic. Overall, 71.4% of ear complaints, 100% of nose complaints, 84.2% of throat complaints, and 63.6% of neck complaints did not require in person consults ($p > 0.10$ for all groups). **Conclusions:** Of the 69 eConsults sent to ENT, 77.9% did not require followup in clinic. We therefore conclude that the use of eConsults prevented unnecessary clinic visits, although this difference was not statistically significant. Efforts should be made to promote the widespread use of eConsults, which leads to the more efficient use of resources.

57. The Impact of Medical Scribes on Patient Satisfaction in an Academic Otolaryngology Clinic

Katherine R. Keefe, BA, Boston, MA; Jessica R. Levi, MD, Boston, MA; Christopher D. Brook, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of medical scribes on patient satisfaction.

Objectives: Evidence shows that scribes can improve provider efficiency and satisfaction in several settings. The evidence for the impact of scribes on patient satisfaction is mixed. There have been no studies evaluating the effect of scribes in otolaryngology clinics. We studied whether scribes affected patient satisfaction with providers and wait times in an academic otolaryngology clinic. **Study Design:** Retrospective review of Press Ganey surveys. **Methods:** We performed a retrospective review of patient responses to the Press Ganey survey between December, 2016 - December, 2017. We analyzed their responses about satisfaction with providers and wait times. Three providers worked with scribes; each spent six months with a scribe and six without. We compared survey responses from periods with and without scribes using the Fischer exact test. We compared average overall provider ratings using the Student's t-test. **Results:** A total of 87 patients filled out Press Ganey surveys for the 3 providers over the year, 54 for visits without scribes and 33 for visits with scribes. Fischer exact analysis demonstrated no significant difference in responses about provider and wait time satisfaction for individual providers and for all providers combined (all $p > 0.05$). There was also no difference in patients' likelihood of recommending the provider's office ($p = 0.91$). Overall provider rating (0 - 10 scale) was high without scribes (9.48 ± 1.06) and was unchanged by the presence of scribes (9.53 ± 0.8) ($p = 0.97$). **Conclusions:** Patient satisfaction with their wait times and providers was high overall and was not affected by the presence of a medical scribe.

58. Consideration of Mononucleosis in Diagnosis and Treatment of Peritonsillar Abscess

Kevin J. Kovatch, MD, Ann Arbor, MI; S. Ahmed Ali, MD, Ann Arbor, MI; Joshua D. Smith, BS, Ann Arbor, MI; Emily L. Bellile, MS, Ann Arbor, MI; John E. Hanks, MD, Ann Arbor, MI; Paul T. Hoff, MD, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss workup and treatment of peritonsillar abscess and discuss the utility of rapid mononucleosis testing in this setting.

Objectives: Peritonsillar abscess (PTA) is commonly associated with streptococcal pharyngitis; however, it may also present as a suppurative complication of mononucleosis. The aim of this study was to determine the implications of mononucleosis positivity in patients treated for PTA. **Study Design:** Single institution retrospective review. **Methods:** Patients treated for diagnosis of PTA from 2000-2017 were included. Demographic and clinical outcome data were analyzed, including treatment, culture data, and recurrence. **Results:** Of 997 patients with diagnosis of PTA, 455 (45.6%) were tested for mononucleosis. Eighty-three patients tested positive for mono (18.2% of tested population). Mono positivity was highest in the young adult group (age 19-30, 48.2% of positive tests). When comparing mono-negative (n=372) and mono-positive (n=83) groups, no significant differences were seen for sex predominance, symptom duration, white blood count, or failed outpatient treatment. No statistically significant differences were observed between groups for clinical signs and symptoms including fever, sore throat, trismus, cough, voice change, dysphagia/odynophagia, dyspnea, or lymphadenopathy. Successful drainage was observed in 53.5% of the mono-negative and 55.4% of the mono-positive group ($p=0.87$). Concurrent rapid strep positivity was seen in only 6.0% of the mono-positive group, though 82.1% of mono-positive abscess cultures isolated bacterial organisms. Recurrent abscess was higher for the mono-negative group (18.3% vs 8.4%, $p=0.03$). **Conclusions:** Mononucleosis testing in patients with PTA is inconsistently performed. Mononucleosis status did not correlate to specific elements of initial presentation; however, mono-positivity did predict lower rate of PTA recurrence. Rapid strep and mono testing should be considered to guide treatment in cases of pharyngitis, but should not alter management when abscess is encountered.

59. Practice Patterns of Antireflux Medication Prescriptions in Otolaryngology Compared to Other Specialties

Friederike S. Luetzenberg, BS, Orlando, FL; Nancy Jiang, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss recent trends in antireflux medication prescription patterns and compare those between otolaryngology, gastroenterology, and family practice.

Objectives: To describe the trends in proton pump inhibitor (PPI) prescription rates and durations and compare them to those of H2 receptor antagonists (H2RA) between 2013 and 2016 in otolaryngology, gastroenterology, and family practice, following the increasing publications on PPI adverse effects and inappropriate prescribing. **Study Design:** Retrospective review of publicly available Medicare Part D prescribing data. **Methods:** PPI and H2RA prescription and beneficiary data were obtained through the Centers for Medicare and Medicaid Services website. For prescription rates, 30 day fill counts were analyzed nationally and regionally per 10K Medicare members. Days' supply per beneficiary was examined to show average prescription durations. Results were compared between otolaryngology, gastroenterology, and family practice. Medication related economic burden per year was calculated based on reported drug cost. **Results:** From 2013 to 2016, PPI 30 day fill counts remained stable, while H2RA prescription rates increased by up to 62% per 10K Medicare beneficiaries. The South consistently prescribed two to three times as much antireflux medication as the lowest prescribing region over time and across all three specialties. The days' supply per beneficiary remained stable and ranged from averagely 128 to 203 days depending on the specialty. Antireflux medication related healthcare cost decreased steadily. **Conclusions:** Despite numerous publications describing a multitude of adverse events and inappropriate prescribing patterns of PPIs in the past decade, prescription rates and durations per beneficiary have remained stable in the fields of otolaryngology, gastroenterology, and family practice. Additionally, H2RA prescriptions have increased significantly from 2013 to 2016.

60. Surgical Outcomes and Quality of Life Changes Following a Spectrum of Head and Neck Surgeries in a Resource Limited Setting

Bharat A. Panuganti, MD, San Diego, CA; Aria Jafari, MD, San Diego, CA; Henry N. Ngoitisi, MMED, Eldoret, NA Kenya; Bruce H. Campbell, MD, Milwaukee, WI; Susan R. Cordes, MD, Ukiah, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to weigh surgical outcomes and changes in patient quality of life following a spectrum of head and neck surgeries performed in a humanitarian capacity.

Objectives: Long term outcomes data is lacking in the realm of humanitarian head and neck surgery. We sought to investigate changes in patient quality of life (QoL) and to discern the incidence of surgical complications following a spectrum of head and neck surgeries performed in a resource limited setting. **Study Design:** Case series with retrospective chart review of adult patients who underwent an otolaryngologic surgery at a teaching and referral hospital with the Academic Model Providing Access to Healthcare (AMPATH) ear, nose, and throat surgical camp in Kenya in 2015 or 2016 before returning for followup in 2018. **Methods:** Fifteen patients who completed a 36 item Short Form Health Survey (SF-36) both preoperatively, and then postoperatively on long term surgical followup for direct comparison were included in the study. Retrospective chart review was performed to collect clinicodemographic information. Postoperative followup included endoscopy and sonography when indicated to assess for surgical complications and disease recurrence. A p value of less than 0.1 was considered the threshold for reporting. **Results:** Average time to and distance traveled for followup was 827.33 days (standard deviation [SD]= 167.07) and 57.6 kilometers (SD=49.7), respectively. Of the eight SF-36 scoring categories, significant improvements were reported in general health (p=0.064) and energy/fatigue (P=0.089). The overall surgical complication rate was 20.0% (n=3), represented by two patients with Frey's syndrome following parotidectomy and one with hypothyroidism following thyroidectomy. There was no incidence of disease recurrence. **Conclusions:** Research investigating QoL changes and complication rates in the humanitarian surgical realm can improve patient outcomes and corroborate the value of short term surgical work in resource limited environments.

61. Development of a Validated Assessment of Patient Reported Outcomes Following Sialendoscopy for Management of Chronic Sialadenitis

Fatemeh Ramazani, BMSc, Edmonton, AB Canada; Amr F. Hamour, MD, Toronto, ON Canada; Caroline C. Jeffrey, MD, Edmonton, AB Canada; Vincent L. Biron, MD, Edmonton, AB Canada; Yaser A. Alrajhi, MD, Edmonton, AB Canada; David W.J. Cote, MD, Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the role of PROs in evaluating the efficacy of new treatment modalities in otolaryngology-head and neck surgery. As well, participants should be able to recognize the patient identified functional deficits associated with chronic sialadenitis.

Objectives: Sialendoscopy is a minimally invasive, gland preserving treatment modality for management of chronic sialadenitis. Clinicians report improved patient quality of life (QoL) following sialendoscopy, but there exists gaps in current literature about patient reported outcomes (PROs). PROs are health outcome measures developed based on patient experience and perceptions. The objective of this study was to create a questionnaire to assess PROs following treatment of chronic sialadenitis with sialendoscopy. **Study Design:** This four phase qualitative study employed grounded theory methodology and a modified Delphi technique. **Methods:** In phase I, fifteen patients were interviewed, using open ended questioning, for identification of QoL domains impacted by chronic sialadenitis. In phase II, these QoL domains were presented to a focus group of three new chronic sialadenitis patients, who were asked to rank them by order of importance. A conceptual framework of QoL domains impacted by chronic sialadenitis was created based on patient consensus. Itemization of the PRO questionnaire was done by a focus group of four otolaryngologists in phase III. Lastly, the ques-

tionnaire was completed in phase IV by cognitive interviewing of five new chronic sialadenitis patients; ensuring ease of understanding and clarity. **Results:** Patients identified 15 domains of QoL impacted by chronic sialadenitis, divided into three subscales: physical symptoms, psychosocial symptoms, and activity restriction. These domains provided the basis for creation of a 22 item PRO questionnaire, with a Likert-type response scale. **Conclusions:** Clinical application of the novel questionnaire produced by this study will allow for an objective assessment of the patient reported effectiveness of sialendoscopy for management of chronic sialadenitis.

HEAD & NECK

62. Insurance Status Effect on Laryngeal Cancer Survival

Nicholas B. Abt, MD, Boston, MA; Anuraag S. Parikh, MD, Boston, MA; Neil Bhattacharyya, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the effect between insurance status and overall and disease specific survival in laryngeal cancer.

Objectives: To analyze relationships between insurance status and overall survival (OS) and disease specific survival (DSS) in laryngeal cancer. **Study Design:** Cross-sectional population analysis of a national cancer database. **Methods:** Laryngeal cancer patients from 2007 to 2016 were extracted from the Surveillance, Epidemiology, and End Results database. Kaplan-Meier method with log rank statistic analyzed OS and DSS by insurance status. Multivariate Cox proportional hazard modeling generated prognostic factors for survival, adjusting for age, sex, and race/ethnicity, stratified for stage. **Results:** Of 19,667 laryngeal cancer cases, initial disease presentation was stage I: 7,770 patients (39.5%), stage II: 3,337 patients (17.0%), stage III: 3,289 patients (16.7%), and stage IV: 5,226 patients (26.6%). Patients had private insurance (15,523, 78.9%), Medicaid (3,306, 16.8%) or were uninsured (891, 4.5%). Mean (and median) OS for insured, Medicaid, and uninsured patients were 60.5 (49.6), 56.6 (74.0) and 40.0 (65.0) months, respectively. Following multivariable analysis, mean OS for insured, Medicaid, and uninsured patients were stage I: 87.9, 82.8, and 88.4 ($p<0.001$), stage II: 79.1, 75.1, and 78.3 ($p=0.12$), stage III: 68.7, 66.1, and 72.1 ($p=0.11$), and stage IV: 57.1, 51.7, and 50.3 ($p<0.001$) months. DSS mean survival times were 77.0, 65.8, and 67.7 months ($p<0.001$) for insured, Medicaid, and uninsured patients. Compared to insured status, Medicaid insurance carried a hazard ratio for death of 1.40 ($p<0.001$) and uninsured status had a hazard ratio of 1.40 ($p<0.001$). **Conclusions:** Insured laryngeal cancer patients demonstrated improved OS and DSS compared to Medicaid and uninsured patients. Such survival discrepancies warrant further investigation.

63. Risks of Thyroidectomy after Indeterminant Fine Needle Aspiration

Richard D. Bavier, BA, Newark, NJ; Sana H. Siddiqui, BA, Newark, NJ; Jesse Veisblatt, BA, Newark, NJ; Soly Baredes, MD FACS, Newark, NJ; Richard Chan Woo Park, MD FACS, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the rates of malignancy and risks of thyroid surgery following an indeterminant diagnosis by fine needle aspiration.

Objectives: To assess the rate of malignancy and risks of thyroid surgery following an indeterminant fine needle aspiration (FNA). **Study Design:** Retrospective database analysis. **Methods:** The 2016 National Surgical Quality Improvement Program Thyroidectomy dataset identified 726 thyroid surgeries with a previous indeterminate FNA, 676 of which met inclusion/exclusion criteria. The incidence of malignant diagnosis as well as incidence of complications was calculated. Finally, multivariant analysis was used to determine possible predictors of malignancy given an indeterminant FNA. **Results:** Of the 676 indeterminant FNA's studied, 218 (32.25%) had a postoperative diagnosis of malignancy. Papillary cancer (N=187; 27.66%) was the most common diagnosis followed by follicular cancer (N=25; 3.7%), medullary cancer (N=3; 0.44%), Hurthle cell cancer (N=2; 0.30%), and other malignancy (N=1; 0.15%). Within the indeterminant FNA cohort, patients experienced the following thyroid specific postoperative complications: recurrent laryngeal nerve injury (N=32; 4.73%), hypocalcemic event prior to discharge (N=15; 2.22%), hypocalcemic event within 30 days (N=30; 4.44%), and neck hematoma (N=5; 0.74%). Overall, 75 (11.09%) of patients experienced a complication following surgery. On multivariate analysis, non-white race was predictive of malignant postoperative diagnosis (OR: 2.21; 95% CI: 1.52-2.97). **Conclusions:** Thyroid surgery following an indeterminant FNA is not without risks. During preoperative counseling, these risks should be weighed against the probability of malignancy.

64. Under-Utilization of Treatment in Elderly Patients with Oropharynx Cancer

Elaine O. Bigelow, MD, Baltimore, MD; Carole Fakhry, MD MPH, Baltimore, MD; Karen T. Pitman, MD, Baltimore, MD; Wayne M. Koch, MD, Baltimore, MD; David W. Eisele, MD, Baltimore, MD; Christine G. Gourin, MD MPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effect of treatment on survival in elderly patients with non-metastatic oropharynx cancer, and describe risk factors associated with a decreased likelihood of treatment in this population.

Objectives: Elderly patients are less likely to receive treatment for cancer. We sought to identify factors associated with

lack of treatment in elderly patients with oropharynx cancer. **Study Design:** Retrospective analysis of Surveillance, Epidemiology, and End Results (SEER) Medicare data. **Methods:** Patients diagnosed with local and regional oropharynx cancer from 2001-2009 comprised the study population. Variables associated with treatment were evaluated using multivariate regression and survival analysis. **Results:** Of 1,391 patients, 15.9% received no treatment. On multivariate analysis, lack of treatment was associated with non-tonsil primary site (OR=1.9 [1.3-2.6]), age > / = 80 years (OR=1.6 [1.1-2.4]), male sex (OR=2.2 [1.4-3.2]), widowed marital status (OR=2.0 [1.3-3.0]), comorbidity (OR=0.4 [0.3-0.6]), diagnosis after 2007 (OR=0.6 [0.3-1.0]), and early hospice entry (OR=8.1 [5.3-12.4]). Hospice was used in the first 180 days after diagnosis in 30.8% of untreated patients, compared with 5.6% of treated patients. In untreated patients, early hospice care was associated with age > / = 80 years (OR=3.0 [1.9-4.6]), the South (OR=2.1 [1.1-3.8]), and rural location (OR=0.3 [0.2-0.8]). Treatment was significantly associated with survival, with worse survival in patients who did not receive treatment (HR=2.6 [2.2-3.1]). **Conclusions:** Treatment is associated with improved survival in elderly patients with non-metastatic oropharynx cancer. Several demographic factors are associated with lack of treatment in this population. Regional factors underlie utilization of hospice in untreated patients. These findings suggest targets for further investigation and intervention.

65. Effect of Medical Comorbidities on Treatment Regimen and Survival Outcomes in Locally Advanced Laryngeal Cancer

Craig A. Bollig, MD, Columbia, MO; Jumah G. Ahmad, BS, Columbia, MO; Laura M. Dooley, MD, Columbia, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to comment on the effect of medical comorbidities on treatment regimen selection and survival outcomes in locally advanced laryngeal squamous cell carcinoma (SCC).

Objectives: Investigate the impact of medical comorbidities on treatment regimen selection and overall survival for patients with locally advanced SCC of the larynx. **Study Design:** Retrospective cohort study using the National Cancer Database (NCDB). **Methods:** The NCDB was queried for patients with T3 and T4 laryngeal cancer. Comorbidity scores were calculated from the Charleson-Deyo comorbidity index (CDCI). Univariate and multivariate analyses were performed to evaluate the association of medical comorbidities on treatment regimen selection and overall survival. **Results:** 14,053 patients were analyzed. 65% of patients had a CDCI score of 0, while 25%, 7%, and 3% had CDCI scores of 1, 2, and 3+, respectively. 57% of patients were treated with chemoradiation therapy (CRT), 28% had a laryngectomy, and the remainder had treatment other than the standard of care. Patients with higher CDCI scores were more likely to receive inferior treatment options other than a laryngectomy or CRT ($p < 0.0001$). Patients with medical comorbidities were more likely to be treated with a laryngectomy than those with a CDCI score of 0 ($p < 0.0001$). Multivariate analyses will be performed to further investigate the independent impact of these treatment differences on patient survival. **Conclusions:** Patients with locally advanced laryngeal cancer and medical comorbidities are more likely be treated with a laryngectomy than those without comorbidities. Additionally, they are more likely to receive inferior treatment options other than CRT or a laryngectomy. Information on the impact of these treatment differences on survival outcomes would be valuable to clinicians.

66. Cesium-131 Brachytherapy for Patients Unable to Tolerate External Beam Radiation Therapy: A Case Series

Jonathan D. Bornstein, BA, Philadelphia, PA; Michael Zhao Cheng, BS, New York, NY (Presenter);
Andi J. Cummins, BS, Cleveland, OH; Voika Bar-Ad, MD, Philadelphia, PA; David I. Kutler, MD, New York, NY;
Adam J. Luginbuhl, MD, Philadelphia, PA; Chad A. Zender, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, participants will be able to recognize limitations of external beam radiation therapy for certain patient populations and the potential for cesium seed brachytherapy as an alternative therapy.

Objectives: Head and neck cancer patients who have a history of intellectual disability, claustrophobia, dementia, or other conditions that make it difficult to tolerate immobility or follow instructions, are often unable to complete external beam radiation. Cesium-131 brachytherapy may serve as an alternative to external beam radiation in treating these patients. **Study Design:** A case series documenting outcomes for five patients treated with cesium seed brachytherapy. **Methods:** Five patients ages 52-88 with head and neck cancers, a history of either intellectual disability, dementia, claustrophobia, or who either declined or failed completing external beam radiation therapy in the past, were implanted with cesium-131 seed brachytherapy on the same day as tumor excision. **Results:** Cesium seed implantation was successful in all five patients with an averaged delivered dose of 70 Gy (range 60Gy-80Gy). In followup, patients experienced no complications and no local-regional recurrence of head and neck cancers with mean followup of 2.65 years. **Conclusions:** Intraoperative placement of cesium 131 brachytherapy can be considered in patients with intellectual disability, dementia or severe claustrophobia as a form of adjuvant radiation.

67. Adjuvant Radiation for Head and Neck Malignant Paragangliomas Is Associated with Improved Survival Outcomes: Analysis of the SEER Database

Richard B. Cannon, MD, Salt Lake City, UT; Luke O. Buchmann, MD, Salt Lake City, UT; Jason P. Hunt, MD, Salt Lake City, UT; Shane Lloyd, MD, Salt Lake City, UT; Ying J. Hitchcock, MD, Salt Lake City, UT; Marcus M. Monroe, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to compare treatment outcomes for head and neck malignant paragangliomas.

Objectives: Head and neck malignant paragangliomas are rare and treatment for these tumors varies between institutions. The primary purposes of this study were to use the Surveillance, Epidemiology, and End Results (SEER) database to evaluate current practice patterns in the use of adjuvant radiation for head and neck malignant paraganglioma patients and to investigate its efficacy in the population based setting. **Study Design:** Prospectively gathered data from the SEER database. **Methods:** There were 77 patients treated for head and neck malignant paragangliomas from 1973 to 2013 identified in the SEER database. Fifty-eight patients (75%) had disease confined to the regional lymph nodes and of these patients, 39 (67%) were treated with adjuvant radiation. 5 year disease specific survival (DSS) and overall survival (OS) were the primary outcomes. **Results:** Patients with head and neck malignant paragangliomas with disease confined to the regional lymph nodes were more likely to receive adjuvant radiation than patients with metastatic disease (p=0.019). For patients with regional disease only, treatment with adjuvant radiation therapy was significantly associated with improved 5 year DSS (77% versus 61%; p<0.001) and OS (69% versus 54%; p<0.001). Improved DSS and OS were significant after controlling for other known covariates on multivariate analysis (HR 0.59, 95% CI 0.44 0.87, p<0.001; HR 0.65, 95% CI 0.47 0.92, p<0.001). The percent utilization of adjuvant radiation for these patients has significantly increased through the study time period from 29% to 73% (p<0.001). **Conclusions:** Adjuvant radiation appears to provide a survival benefit for patients with head and neck malignant paragangliomas with regional disease only. Utilization of adjuvant radiation is increasing over time for these patients.

68. Predictors of Recurrence in T1 and T2 Oral Tongue Squamous Cell Carcinoma

Benjamin J. Damazo, MD, Loma Linda, CA; Yuan F. Liu, MD, Loma Linda, CA; Jared C. Inman, MD, Loma Linda, CA; Jason E. Gilde, MD, Loma Linda, CA; Daniel I. Kwon, MD, Loma Linda, CA; Pedro F. De Andrade, MD, Loma Linda, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the histopathologic factors and their use in predicting cancer recurrence in T1 and T2 oral tongue squamous cell carcinoma as well as the role of radiation therapy in early stage OTSCC.

Objectives: To examine outcomes of T1 and T2 oral tongue squamous cell carcinoma (OTSCC), test for potential predictors of recurrence, and compare long term survival based on predictors. **Study Design:** From 2000 to 2012, a retrospective review of all T1 and T2 OTSCC patients treated at our medical center. **Methods:** Multivariate regression was used to look for predictive variables for recurrence. Specific factors examined include nodal status, perineural invasion, lymphovascular invasion, depth of invasion, extracapsular spread, tumor differentiation, margin status after resection, and T stage. Kaplan-Meier survival plots were used to compare disease free survival based on predictors of recurrence. The literature was reviewed and categorized with individual risk factors examined for their prognostic value in predicting recurrence. **Results:** 100 patients were studied. Of these, 51 were staged pT1, 49 pT2, 69 pN0, 10 pN1, and 21 pN2. Multivariate analysis revealed that >4 nodes was the only predictor of overall recurrence (odds ratio 1.68 [1.23-2.28], p =0.001), while >4 nodes (odds ratio 1.14 [1.09-1.85], p =0.008) and pT2 (odds ratio 1.15 [1.01-1.30], p =0.033) were predictors of local recurrence (R2 = 0.112). Overall disease free survival was 82.8% at 5 years and 81.8% at 10 years. Five year disease free survival was 86% for <= 4 nodes versus 20% for >4 nodes (p <0.001), while it was 90% for pT1 versus 75% for pT2 (p =0.035) despite whether adjuvant radiation and/or chemotherapy were used. **Conclusions:** Five and ten year disease free survival for T1 or T2 OTSCC were high regardless of N stage. Patients who underwent adjuvant radiation and/or chemotherapy had similar survival to those who did not despite having worse overall tumor prognostic factors. Surprisingly, adjuvant therapy was not able to control recurrence in those with >4 nodes and pT2 staging, resulting in worse survival in both.

69. Determination of Micrometastasis in PET Negative Neck Nodes Primarily Treated with Radical CTRT for Pharyngeal and Laryngeal Lesions: A Retrospective Analysis

Somdipto B. Das, MD, Los Angeles, CA; Niels C. Kokot, MD FACS, Los Angeles, CA; Uttam K. Sinha, MD FACS, Los Angeles, CA; Mark S. Swanson, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the correlation among PET negative neck nodes and micrometastasis to explain the role of neck dissection in previously treated pharyngeal or laryngeal lesions with radical CTRT. This will discuss the role of salvage neck dissection in neck positive per primum patients and will compare their disease free survival and recurrence among those two groups.

Objectives: The primary objective aims to look at the correlation among PET negativity and micrometastasis in nodal stations in recurrent lesions of primary site. The secondary objective aims to look at the disease free interval of the patients with micromets to the one without. **Study Design:** The study is a retrospective case control study and sufficient patient populations will be included taking into consideration the power of the study. The study consists of recruiting patients who have undergone neck dissection following recurrence to the primary site in RT/CTRT treated per primum laryngeal and pharyngeal lesions with PET negative nodes. Following surgical salvage to the primary diseased site and neck nodes, the study samples are divided into 2 groups based on the presence or absence of micrometastasis in the nodes. **Methods:** Study Design: Retrospective cohort. Independent variables. Positive/negative PET. Outcome measures/dependent variables. Predictive value positive (PVP) for positive PET. Predictive value negative (PVN) for negative PET. Secondary outcomes: Time to disease recurrence in micro-metastasis positive v. negative patients. Overall survival (5 years). Disease free survival (5 years). Stratifying variables: None. Statistical test consideration. Calculation of predictive value positive, predictive value negative. Power (assumed ~80%) preliminary, based on clincalc.com can confirm at later date. PVP: 20% (observed PVP, lower limit) v. 50% (predicted PVP). Significance level (alpha): 0.05. Sample size: 17. **Results:** The result intends to show a poorer correlation between the PET negativity and micrometastasis in the nodes which was initially positive and undergone radical RT/CTRT. The results also focus on the importance of low DFS in the group which has micrometastasis than the one without following initial treatment. **Conclusions:** PET CT is not the diagnostic modality of choice for diagnosing occult nodal metastasis in a previously treated laryngeal and pharyngeal lesions and thus surgical plan should include salvage neck dissection.

70. Presumed Diagnosis of Branchial Cleft Cysts Leads to Delayed Recognition of Metastatic HPV Positive Oropharyngeal Squamous Cell Carcinoma

Ruth J. Davis, MD, Baltimore, MD; Eleni M. Rettig, MD, Rochester, MN; Nafi Aygun, MD, Baltimore, MD; David W. Eisele, MD, Baltimore, MD; Carole Fakhry, MD MPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the clinical progression from initial single cystic lymph node to diagnosis of HPV-OPC in patients with an initial incorrect diagnosis of branchial cleft cyst.

Objectives: To describe patients with diagnosis of HPV positive oropharyngeal squamous cell carcinoma (HPV-OPC) after initial incorrect diagnosis of branchial cleft cyst. **Study Design:** Retrospective case series. **Methods:** Patients with HPV-OPC identified in 2018 tumor board discussion, with prior diagnosis of branchial cleft cysts were eligible for analysis. Charts were reviewed to describe clinical characteristics at initial presentation of branchial cleft cyst and diagnosis of HPV-OPC. To estimate nodal growth rates, the short axis diameter of the lymph nodes was determined on imaging studies. **Results:** Six patients met eligibility criteria. At the time of presumed branchial cleft cyst, no mucosal abnormalities were appreciated upon review of outside notes. Each patient had a single cystic neck mass. After a median interval of 42 months (range 3 months to 7 years), patients were diagnosed with HPV-OPC. At the time of HPV-OPC diagnosis, all were AJCC 8th edition overall stage I. Primary tumors were <=T1 in the majority (83.3%, n=5). Among five patients with available serial imaging, after diagnostic delay three of five still had a single lymph node without involvement of additional nodes. Two of five had evidence of extranodal extension and two had additional nodes (ipsilateral and contralateral). Median lymph node growth was 9.5% per year (range -6% to 32%). **Conclusions:** Clinical progression from initial single cystic lymph node to correct diagnosis of HPV-OPC is described. While a primary precursor lesion remains unknown for HPV-OPC, this is the first series of patients with lymph node preceding diagnosis of HPV-OPC by up to 7 years.

71. A Low Cost High Fidelity Model for Training Peritonsillar Abscess Drainage

Aaron J. Done, PhD, Tucson, AZ; Marshall J. Fairres, BS, Tucson, AZ; Cody J. Smith, BS, Tucson, AZ; Shawn M. Stevens, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to describe a new low cost model for peritonsillar abscess drainage that may expedite clinical skills acquisition.

Objectives: Peritonsillar abscess (PTA) is a commonly encountered clinical entity. While PTA drainage is a relatively simple procedure technically, it can be difficult for trainees to understand the complex 3 dimensional anatomy of this region, especially considering cases where attendant anatomy is distorted by infection. To expedite acquisition of procedural competency, numerous models have been developed but are typically limited by their high cost, lack of clinical fidelity, and limited reusability. We demonstrate here a novel, concept design for a cost effective PTA model that addresses these concerns and may expedite clinical skills acquisition. **Study Design:** Concept proposal, clinical cadaveric model. **Methods:** A novel abscess model was developed that utilizes a commercially available, tieless latex balloon secured to a 10cm 14 gauge blunt tip needle by a latex O ring. This needle and balloon system allows easy placement of the abscess model into the extracapsular plane of either a fresh frozen or preserved cadaveric head. **Results:** Inflation with the abscess solvent creates uvular deviation, superior pole displacement and changes in tissue turgor akin to a clinically encountered PTA. Radiographic appearance of the model and clinical cases were compared. Location and appearance of the PTA model exhibited high fidelity compared to clinical cases. Both needle aspiration and incision/drainage closely mimicked clinical cases as graded by expert level providers. Excluding costs of cadaveric specimens and their handling, this system costs less than $1 USD per use. **Conclusions:** Using this novel deployment system, a PTA can be simulated at low cost while

maintaining high clinical and radiographic fidelity.

72. Characterizing Posterior Neck Masses: A Single Institution Retrospective and Systematic Review

Andrey Finegersh, MD PhD, San Diego, CA; William Moss, MD, San Diego, CA; Danielle Gillard, BS, San Diego, CA; Kevin Brumund, MD, San Diego, CA; Charles Coffey, MD, San Diego, CA; Ryan Orosco, MD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify common pathologies associated with posterior neck masses and trends in workup, including imaging and biopsy.

Objectives: The posterior neck is an anatomic space between the posterior borders of the trapezius muscles, occiput, and T1 vertebra. There are currently no case series or systematic reviews characterizing posterior neck masses, representing a gap in the literature. This study seeks to characterize pathology of posterior neck masses and analyze preoperative workup and perioperative care associated with this space. **Study Design:** Since institution retrospective case series and systematic review of the literature on posterior neck masses. **Methods:** A single institution retrospective chart review was undertaken for all patients undergoing excision of a posterior neck mass between January 1, 2012, and January 1, 2017. Demographic data, surgical outcomes and pathologic data were assessed and compiled. A systematic review of the Medline, Embase, Web of Science and Cochrane database was undertaken in search of case reports and case series describing posterior neck masses. **Results:** A total of 28 patients who underwent excision of a posterior neck mass were encountered during the retrospective chart review. All pathologies were benign, the most prevalent of which were lipomas (22/28, 79%). No surgical complications were encountered. A total of 19 articles describing a collective 36 posterior neck masses were encountered during the systematic review. Lipomas were the most common pathology (15/36, 42%). All but one of the masses reported were benign (35/36, 97%). **Conclusions:** Patients presenting with posterior neck masses can be reassured of a low risk of malignant pathology. The majority of posterior neck masses can be appropriately evaluated via history and physical exam alone. CT scans, MRIs and biopsies can be reserved for atypical presentations only. Surgical outcomes are favorable.

73. First Line Surgery Is Associated with Improved Survival among Patients with Locoregionally Advanced Hypopharyngeal Squamous Cell Carcinoma: An Evaluation of SEER Data

Colleen G. Hochfelder, BS, Bronx, NY; Vikas Mehta, MD, Bronx, NY; Aileen P. McGinn, PhD, Bronx, NY; Thomas J. Ow, MD, Bronx, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to summarize the relationship between primary treatment and survival among patients with locoregionally advanced hypopharyngeal cancer in the US from 2004-2015.

Objectives: Prior reviews of the Surveillance, Epidemiology and End Results (SEER) database have demonstrated a trend towards primary chemoradiation (CRT) in the management of hypopharyngeal cancer. The objective of this study was to examine the relationship between primary treatment and survival among patients with locoregionally advanced hypopharyngeal cancer in the US from 2004-2015. **Study Design:** Retrospective cohort. **Methods:** A total of 2,662 adult patients diagnosed with stage III or IV, M0, hypopharyngeal squamous cell carcinoma were identified within the SEER database (years 2004-2015) for analysis. **Results:** The median survival time for patients diagnosed with all stages of hypopharyngeal cancer diagnosed between 2004-2015 was 16 months (IQR 6, 42). Among patients with stage III or IV M0 disease who were treated with primary CRT, the median survival was 20.5 months (10, 46). This differed significantly from the median survival among patients treated primarily with surgery and adjuvant radiation therapy (RT) or RT and chemotherapy (25 months, $P<0.001$). Patients managed with initial surgery and adjuvant RT or radiation + chemotherapy had higher grade cancers ($P<0.001$), and more advanced T staging ($P<0.001$). Cox regression analysis demonstrated that primary surgical treatment was associated with longer disease specific survival (HR 0.74, $P<0.0001$) after adjusting for age, race, primary site of tumor, tumor grade, and tumor staging characteristics. **Conclusions:** Among patients reported in SEER, patients who were treated with primary surgery were more likely to have more advanced and aggressive disease. Despite this fact, patients treated with primary surgery had longer disease specific and overall survival compared to those treated with primary chemoradiation.

74. The Determinants of Overall Survival in Head and Neck Cancer: The Interaction of Charlson Comorbidity Index, Socioeconomic Factors, and Race

Ayaka J. Iwata, MD MS, Detroit, MI; Amy M. Williams, PhD, Detroit, MI; Meredith G. Van Harn, MS, Detroit, MI; Steven S. Chang, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the how the Charlson Comorbidity Index, socioeconomic factors, and race influence outcomes of head and neck cancer survival.

Objectives: Higher Charlson Comorbidity Indices (CCI), lower socioeconomic status (SES), racial disparities have been linked to poor survival in several types of cancer. We investigated the impact of each of these on overall patient survival

with head and neck cancer. **Study Design:** A retrospective cohort study was performed on all patients from a single large academic medical center with any type of head and neck cancer, from January 1997 to November 2016. **Methods:** Data extracted includes race/ethnicity, age, gender, primary site of malignancy, clinical staging, mode of treatment, surgical pathology, post-treatment survival, markers of SES (median household income, percentage above or below poverty level, education level based on census tract and block information from the U.S. census data), and CCI. Standard statistical analysis was performed using Kaplan-Meier survival curve analyses and Cox proportional hazard models. **Results:** There were a total of 4626 males and 3901 females. Overall survival was performed relative to cancer type, staging, SES, CCI, and race. Preliminary data suggests that CCI independently predicted overall survival. This proved to be true in the multivariate analysis when adjusted for clinical staging, age, sex, race, and treatment modality. Race and SES correlated to each other, but did not independently confer an increased risk of death in head and neck cancer. **Conclusions:** We conclude that Charlson Comorbidity Index is a valid prognostic indicator in head and neck cancer, independent of race and SES.

75. Head and Neck Juxtacortical Chondrosarcoma: A Case Report and Systematic Review

Alexander J. Jones, BS, Indianapolis, IN; Mohamedkazim Alwani, MD, Indianapolis, IN; Don-John Summerlin, DMD, Indianapolis, IN; Michael W. Sim, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the presentation, imaging, histopathology, and management of head and neck juxtacortical chondrosarcomas (HNJC).

Objectives: To present a case and systematically evaluate trends in clinical presentation, imaging, histopathology, and management modalities and outcomes of all HNJC cases reported in the existing literature. **Study Design:** Case report and qualitative systematic review. **Methods:** We describe a rare case of HNJC following which the PubMed and Medline databases were exhaustively searched for all reports of HNJC (N = 7). The clinical findings, tumor characteristics, imaging and histopathologic findings, and management modalities and outcomes were systematically collected and resulting trends summarized. **Results:** The mean age at presentation of HNJC was 42 years with a slight male preponderance. The most common presenting sign was a painless, isolated, mandibular swelling. On average, patients presented for medical attention after 2.5 months of ongoing symptoms. CT imaging revealed hypodense lesions with peripheral enhancement and microcalcifications. T1 weighted MRI showed hypo- to iso-intense, lobulated masses with peripheral and/or septal enhancement. The masses were diffusely hyperintense on T2 weighted MRI. Histopathology demonstrated septated lobules of malignant hyaline cartilage with a peripheral fibrous capsule. Local recurrence was identified in one patient four years after initial resection. No distal and/or nodal metastases were identified. All tumors were managed by wide or narrow margin surgical excision alone. There was no evidence of disease at final followup. **Conclusions:** To the best of our knowledge, only seven cases of HNJC have been adequately described, making it an astoundingly rare condition. HNJC have a relatively consistent clinical and diagnostic profile. Surgical management yields excellent outcomes with low rates of recurrence.

76. Impact of High Volume Centers in TORS for Oropharyngeal Squamous Cell Carcinoma

Suat Kilic, MD, Cleveland, OH; Sarah S. Kilic, MD, Cleveland, OH; Meghan M. Crippen, MD, Philadelphia, PA; Jean Anderson Eloy, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the impact of high volume centers in transoral robotic surgery for oropharyngeal squamous cell carcinoma (OPSCC).

Objectives: Determine the impact of high volume centers in transoral robotic surgery (TORS) for oropharyngeal squamous cell carcinoma (OPSCC). **Study Design:** Retrospective cohort study. **Methods:** Cases of OPSCC receiving surgical treatment were identified in the National Cancer database. Average number of TORS cases per year was determined for each facility. High volume center was defined as facilities in the top 10%. Demographics, socioeconomic characteristics, stage, histologic grade, HPV status, lymph node surgery, adjuvant chemoradiation, time to surgery, margins, length of stay, 30 day readmissions, and overall survival was compared between high volume and low volume centers. **Results:** Among 74,289 cases of OPSCC, 20,299 received surgical treatment by 1,192 facilities. 4,039 cases received TORS by 229 facilities (23 high volume, 206 low volume). High volume centers performed 15.8 cases/year (minimum 6.8, maximum 63.2), and low volume centers performed 9.2 cases/year (minimum 0.2, maximum 6.7). Patients receiving TORS at high volume centers more commonly were <50 years old, white, had 0 Charlson-Deyo comorbidity score, had private insurance, higher income, N2 stage, high grade tumors, HPV positive tumor, achieved negative margins, received adjuvant radiotherapy, received prompt surgery, and had higher overall survival (83.2% vs. 75.9% at 5 years) ($p<0.05$ for all). On multivariable Cox regression analysis, high volume status was associated with a statistically significant decrease in mortality at one year (HR=0.65, 95% CI=0.44-0.97), but not at 3 or 5 years. **Conclusions:** Patients receiving TORS at high volume centers are more likely to be young, of higher socioeconomic background, have HPV positive tumors, nodal spread, receive adjuvant radiotherapy, prompt surgery, achieve negative margins, and survive longer.

77. Intratracheal Ectopic Parathyroid: An Unexpected Diagnosis

Susan J. Kurian, MD, Shreveport, LA; Mingxia M. Shi, MD, Shreveport, LA; Monsour L. Mirfakhraee, MD, Shreveport, LA; Cherie-Ann O. Nathan, MD FACS, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss ectopic intratracheal parathyroid tissue and compare treatment strategies for unknown tracheal mass.

Objectives: To present a unique case of intratracheal parathyroid gland, a rare occurrence that has not yet been described in the literature. We present this case to increase awareness of this potential diagnosis. **Study Design:** Case report. **Methods:** A 36 year old female was referred after imaging workup for neck pain showed a paratracheal mass. Computed tomography revealed a 2 cm left subglottic mass. **Results:** No mass was palpable in the neck. Flexible scope showed 25% airway narrowing and an erythematous, vascular mucosal lesion just below the level of the cricoid. The patient underwent bronchoscopy with transbronchial needle biopsy. Pathology was consistent with benign parathyroid tissue. As serial calcium and PTH testing were normal and the patient was asymptomatic, clinical surveillance with imaging has been recommended at this time. **Conclusions:** Ectopic parathyroid tissue has been described in the literature in cases found during workup for parathyroid adenoma. Reports have shown supernumerary or ectopic glands in the retropharyngeal, retrolaryngeal, or retroesophageal location, anterior or posterior mediastinum, carotid sheath, thymus, anterior cricoid, or intrathyroidal. There have been sporadic cases noted in the oropharynx, nasopharynx, or invested in hypoglossal nerve. To our knowledge, this is the first case of intratracheal benign parathyroid. Diagnosis of this possible finding is important in preventing unnecessary intervention or disruption of functional tissue.

78. Lymph Node Metastasis Patterns in Soft Palate Squamous Cell Carcinoma: A Population Based Analysis

Jingfeng Liang, BA, Los Angeles, CA; Albert Y. Han, MD PhD, Los Angeles, CA; Christine M. Kim, MD, Los Angeles, CA; Maie St. John, MD PhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify which lymph node groups are most frequently involved in soft palate SCC and which ones are associated with worse survival outcomes.

Objectives: Soft palate SCC is an uncommon variety of oropharyngeal cancer which is frequently detected at later stages during which lymph node metastasis is present. The purpose of this study is to assess the relationship between survival outcomes (OS and DSS) in soft palate SCC and the involvement of specific lymph nodes. **Study Design:** Retrospective database analysis. **Methods:** Using the SEER 18 registry from 1973-2015, patients with available lymph node data were identified. Multivariate Cox regression was used to assess the relationship between lymph node involvement and OS/DSS. **Results:** 1930 patients were identified; among these, 630 patients had involvement of at least one lymph node group. The lymph node group most commonly involved in soft palate SCC were the group II (submandibular) nodes (N = 473), followed by the submental and deep cervical lymph nodes (N = 178 and 170, respectively). For patients with involvement of only one lymph node group, the specific location of that group did not significantly affect survival outcomes ($p = 0.14$); however, most patients had involvement of more than one lymph node. For these patients, involvement of the superficial cervical (group IV) and retropharyngeal lymph nodes were associated with significantly worse OS ($p = 0.02$) and DSS ($p < 0.01$), after controlling for N stage. **Conclusions:** The lymph nodes most frequently involved in soft palate SCC are the submandibular, submental and deep cervical lymph nodes. Metastasis to the retropharyngeal and superficial cervical lymph nodes, while less frequent, appear to be associated with worse survival outcomes.

79. Recurrent Laryngeal Nerve Paralysis after Total Thyroidectomy in Commercially Insured Patients

Ioan A. Lina, MD, Baltimore, MD; Hsien-Yen Chang, PhD, Baltimore, MD; Jonathon Russell, PhD, Baltimore, MD; Ralph Tufano, MD, Baltimore, MD; David Eisele, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the risk factors associated with short and long term recurrent laryngeal nerve paralysis following total thyroidectomy and its associated healthcare costs.

Objectives: Recurrent laryngeal nerve (RLN) paralysis is a dreaded complication of thyroid surgery. We sought to identify factors associated with postoperative RLN paralysis after total thyroidectomy and to explore the relationship between RLN paralysis and costs of care. **Study Design:** Retrospective cross-sectional analysis of 126,766 patients undergoing total thyroidectomy in 2010-2012 using the MarketScan Commercial Claims and Encounters database. **Methods:** Short and long term RLN paralysis and costs of care were examined using multivariate regression modeling. **Results:** Postoperative RLN paralysis was present in 2.2% of patients in the initial 30 day postoperative period and in 1.4% of patients at 1 year. Tracheostomy was performed in 0.4% of all patients and in 7.2% of patients with RLN paralysis. Short and long term RLN paralysis was significantly more likely for age >= 40 years, concurrent lateral neck dissection, postoperative hypocalcemia, and postoperative radiation therapy. Compared to the initial postoperative period, the odds of RLN paralysis decreased by 53% (odds ratio [OR]=0.47 [0.39-0.55]) at 6 months and 67% (OR=0.33 [0.28-0.40]) at 1 year, after controlling for all other variables. The mean incremental overall 1 year costs of care were significantly increased for patients

with RLN paralysis, and were greatest for patients requiring tracheostomy, exceeding all other treatment related costs. **Conclusions:** RLN paralysis is uncommon after total thyroidectomy, resolves in the majority of cases by 1 year, and is associated with the extent of treatment, comorbidity, and increased costs of care.

80. Intramuscular Myxoma Mistaken for Vagal Nerve Schwannoma: A Case Report

Brian F. Manzi, MD, Shreveport, LA; Cherie-Ann A. Nathan, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss an unusual location and presentation of an intramuscular myxoma, masquerading by appearance, presentation, and imaging findings as a vagal nerve schwannoma.

Objectives: To discuss an unusual location and presentation of an intramuscular myxoma, masquerading by appearance, presentation, and imaging findings as a vagal nerve schwannoma. **Study Design:** Case report. **Methods:** An 86 year old Caucasian female was referred for a slow growing asymptomatic right neck mass. **Results:** A 4 x 6 cm immobile level 2 neck mass was noted with normal vocal cord movement. MRI demonstrated a lobulated mass in the deep soft tissue of the neck displacing the carotid vessels laterally consistent with a vagal nerve schwannoma. A core biopsy was consistent with intramuscular myxoma. Observation with serial MRIs was recommended given the age of the patient and asymptomatic nature of the benign tumor. **Conclusions:** Intramuscular myxoma rarely presents in the head and neck region with a total of 79 cases reported in the literature. Currently, there are no cases reported with displacement of the carotid sheath. Myxomas are slow growing radiation insensitive tumors with no metastatic potential. They are locally infiltrative and lack a fibrous capsule making surgical resection difficult. Similarly, schwannomas are also slow growing, with a reported annual growth rate of 3 mm, and a malignancy rate of 8 - 13.9%. Observation is also a valid treatment option; however, if there is rapid growth radiation therapy may control the rate of growth. We present the case due to the unique head and neck presentation and location of this intramuscular myxoma with its unusual imaging appearance. The goal of the case presentation is to add to the differential diagnosis for neck masses displacing the carotid sheath.

81. NK-T Cell Lymphoma of the Soft Palate

Jacqueline Joy Masehi-Lano, BS, San Francisco, CA; Christopher G. Tang, MD, San Francisco, CA (Presenter)

Educational Objective: At the conclusion of this presentation, the participants should be able to identify cases of NK-T cell lymphoma and understand the treatment options for it.

Objectives: To discuss a unique case of extranodal NK (Natural Killer) T cell lymphoma. **Study Design:** A case report with review of literature. **Methods:** A 60 year old male presenting with nasal obstruction and epistaxis for 5 months. Patient was treated in Thailand with three courses of antibiotics and prednisone without improvement. At time of presentation patient had a large nasopharyngeal mass originating from the nasal surface of the soft palate. In-office biopsy of the mass showed possible lymphoproliferative disease. **Results:** The patient was brought into the operating room and a biopsy performed of the nasopharyngeal mass which showed an NK-T cell lymphoma. The patient was referred to hematology/oncology for chemotherapy. **Conclusions:** Extranodal NK-T cell lymphoma is rare manifestation of T cell lymphoproliferative disorders that can be found in various parts of the head and neck, especially within the nasal cavity. Care should be taken to obtain adequate tissue biopsies for masses in the nasal cavity that are suspicious for this clinical entity.

82. Delayed Recurrence of Metastatic Testicular Teratoma in the Neck

Thomas H. McMullen, BS, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss their experiences with or exposure to delayed recurrences of metastatic testicular teratoma in the head and neck region.

Objectives: There have been few reports describing delayed metastases from testicular teratomas to the head and neck region. It has been previously estimated that 6.5-15% of late relapses, depending on germ cell tumor type, occur in the supraclavicular region. We report the case of a patient with a history of metastatic mature cystic teratoma of the testicle who presented with a delayed recurrence in the left supraclavicular neck 18 years after primary orchiectomy and chemotherapy. **Study Design:** Case report. **Methods:** A 36 year old white male with history of metastatic mature testicular teratoma presented to our head and neck clinic with a new cystic mass in his left supraclavicular neck. CT scan revealed a septated seven centimeter mass in the left supraclavicular fossa. FNA was positive for malignant cells. Preoperative tumor markers including CEA, LDH, AFP, and ²-hCG were normal. Excision of the mass was recommended. **Results:** Intraoperative findings revealed a cystic mass in the left supraclavicular fossa causing medial displacement of the common carotid artery and anterolateral displacement of both the internal jugular vein and vagus nerve. Final pathology was most consistent with a mature cystic teratoma. The patient did well and has showed no signs of tumor recurrence since his surgery. **Conclusions:** Although rare and infrequently reported, it is important to include delayed recurrence in the differential diagnosis for patients who present with a neck mass and history of testicular teratoma.

83. Rigid Tracheostomy Tubes and Cutaneous Ulceration: An Institutional Review across Multiple Surgical Services

Catherine M. Merna, MD, Irvine, CA; Daniel L. Diaz-Aguilar, MD, San Diego, CA; Tjoson T. Tjoa, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should recognize the potential impact of rigid tracheostomy tubes phalanges on cutaneous ulcer development.

Objectives: Evaluate the cutaneous ulceration rate associated with institution wide use of nonflexible tracheostomy tubes prior to transition to a flexible equivalent. **Study Design:** Retrospective review of institutional records. **Methods:** Accounting was queried for all cases of planned (CPT 31600), fenestrated with skin flaps (31610), and emergent (31603) tracheostomies performed by otolaryngology and general surgery between July 2013 and July 2018. All nursing records of tracheostomy related ulceration over the same time interval were reviewed. **Results:** There were a total of 275 open tracheostomies performed by otolaryngology (272 planned, 3 emergent) and 387 by general surgery (378 planned, 9 emergent) over the 5 year span studied at a single institution. Among 37 tracheal ulcers (5.6% of cases), fifteen were stage 2 (40%), six were stage 3 (16%), and six were unstageable (16%). Twenty-six cases were noted in critical care (70%), ten in stepdown (27%), five on transfer of the patient from a tertiary care facility (14%), and one case (3%) presented from home. Of the 29 tracheostomies leading to ulceration, 14 were by general surgery (10 open, 4 percutaneous) and 10 by otolaryngology (all open) for a complication rate of 3.6% in each department. **Conclusions:** Near equal tracheostomy related cutaneous ulceration rates arose in different surgical services at one institution despite rigorous precautions such as frequent suctioning, dry padded foam dressings, and early suture removal. Future investigations into rigid tracheostomy tubes as a risk factor, after institutional implementation of flexible tracheostomy tubes, will follow.

84. A Novel Technique for Tracheal Resection and Reconstruction

Margaret C. Michel, BS, Washington, DC; Sahil P. Patel, BA, Washington, DC; Daniel A. Benito, MD, Washington, DC; Sean B. Bury, MD, Washington, DC; Punam G. Thakkar, MD, Washington, DC; Arjun S. Joshi, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand this novel technique for tracheal resection and its outcomes.

Objectives: The objective of this study is to describe a novel single stage technique of tracheal resection for thyroid, inflammatory, or primary tracheal pathology. This method of tracheal resection is applicable for patients with tracheal stenosis originating below the cricoid cartilage and who need multiple rings resected. **Study Design:** Retrospective study with a case series. **Methods:** This is a retrospective case series of 5 patients who have undergone this method of multiple ring tracheal resection for tracheal stenosis below the cricoid cartilage from 2014-2017. The technique is described with associated diagrams and relevant associated pictures. Complications, time to tracheostomy decannulation, and time to breathing without difficulty were assessed. **Results:** All 5 patients were decannulated. The time to decannulation varied from 13-72 days with an average decannulation time of 29.75 days. No patients had complications related to this procedure. All patients were breathing normally and without difficulty within one month of their procedure. One patient required redilation. **Conclusions:** This appears to be a feasible method for tracheal resection which appears to avoid certain postoperative complications and perioperative management issues. Among our 5 patients, this technique resulted in no complications and patients quickly returned to normal unassisted breathing.

85. Oral Cavity Squamous Cell Carcinoma as a Complication of Treatment for Recurrent Ovarian Cancer

Lindsey E. Moses, MD, New York, NY; Janine M. Rotsides, MD, New York, NY; Fiyinfolu O. Balogun, MD, New York, NY; Mark S. Persky, MD, New York, NY; Franco M. Muggia, MD, New York, NY; Michael J. Persky, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should have greater awareness of and be able to describe the risk of secondary malignancy in the oral cavity following the use of pegylated liposomal doxorubicin.

Objectives: Advances in cancer treatment have increased survival for many patients, prompting a need for greater recognition of the long term complications of treatment. Chemotherapy agents have the potential to induce carcinogenesis in normal cells and can increase the risk of secondary malignancy. Pegylated liposomal doxorubicin (PLD) used for treatment of recurrent ovarian cancer has been associated with the development of oral squamous cell carcinoma. **Study Design:** Retrospective case series. **Methods:** Retrospective review of oral cavity squamous cell carcinoma (SCC) in patients with recurrent ovarian cancer treated with PLD between 1997-2017 at a single institution. **Results:** Eight patients treated with PLD developed oral cavity SCC. The duration of PLD use ranged from 1.3-15 years (mean 5.8) and cumulative dose ranged from 45-3000 mg/m2 (mean 1542). Seven patients tested positive for BRCA mutations (4 BRCA 1+, 3 BRCA 2+). No patients had a history of alcohol or tobacco use. All had early stage oral cavity disease, five were T1N0, two were T2N0, and one had carcinoma in situ. All patients underwent surgery, two received adjuvant radiation. Four developed locoregional recurrence requiring additional treatment. One patient died from complications of oral SCC and one from recurrent ovarian carcinoma. Three patients were NED in the head and neck at last followup, one patient had

metastatic ovarian cancer and one metastatic SCC of the skin. **Conclusions:** Long term PLD therapy may be associated with the development of oral cavity SCC. A high index of suspicion and routine head and neck examination should be included in followup for exposed patients.

86. Floral Variant Follicular Lymphoma of the Oropharynx

Kelly F. Moyer, MD, Washington, DC; Christopher P. Mesick, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the immunophenotypic characteristics of floral type follicular lymphoma.

Objectives: Follicular lymphoma has been described in approximately 10% of oropharyngeal malignant lymphomas. Floral type follicular lymphoma is a rare but distinct entity. To our knowledge, floral type follicular lymphoma has not been described in the oropharynx. This report describes the relevant pathologic and immunohistochemical findings to recognize this phenotype and avoid misdiagnosis. **Study Design:** Retrospective review. **Methods:** Case report. **Results:** A 70 year old female presented with several months of globus. Direct laryngoscopy and excision demonstrated a well circumscribed, pedunculated, submucosal, pharyngeal wall mass, arising from the glossotonsillar sulcus, separate from the tonsil. Surgical pathology revealed follicular lymphoma, grade 1-2, floral variant. Microscopic analysis characterized squamous mucosa with atypical lymphoid infiltrate, nodular growth pattern. Additionally, numerous primary lymphoid follicles and focal sclerosis were seen in uninvolved areas. Atypical nodules were composed of medium sized atypical lymphoid cells with centrocyte type morphology forming ill defined clusters, admixed with small lymphocytes. Atypical cells were positive for CD20, CD21, CD10, BCL-6, LMO2 and BCL2 and negative for CD5, CD23 and BCL-1 (cyclin D1). CD21 highlights the follicular dendritic cell meshwork associated with atypical nodules and residual primary follicles. MUM1 reveals scattered plasma cells, showing polytypic kappa and lambda light chain expression. MIB 1 indicates a relatively high proliferative rate in the atypical cells. **Conclusions:** Findings in this specimen are consistent with the floral variant of follicular lymphoma, a rare finding in the oropharynx. This variant had a relatively high proliferative rate, reported to be associated with a worse prognosis. Recognition of this immunophenotype is rare and important to avoid misdiagnosis.

87. Obstructive Pyriform Sinus Lipoma Excised with CO2 Laser

Kelly F. Moyer, MD, Washington, DC; Matthew L. Pierce, MD, Washington, DC; Sarah K. Rapoport, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize lipomas of the hyopharynx and consider laser excision for removal.

Objectives: Although lipomas of the hypopharynx are rare, they should be recognized as potential for obstruction. Surgical excision is recommended and laser assisted removal is an elegant option for moderately sized tumors. **Study Design:** Retrospective review. **Methods:** Case report. **Results:** Only 15% of all lipomas occur in the head and neck, typically in the posterior neck. Lipomas of the hypopharynx are rare tumors and surgery is the recommended treatment. Surgical approach for excision depends on the size and location of the lipoma. The three approaches described are endoscopic, transoral robot and transcervical, with lateral pharyngotomy. This is a case of a 39 year old male presenting with dysphagia and occasional shortness of breath, found to have a hypopharyngeal mass. CT scan demonstrated a fat containing, 3.8 x 3.4 x 3.3 cm mass occluding the airway. He underwent tracheostomy for airway protection. Direct laryngoscopy revealed a well circumscribed, submucosal, pedunculated mass arising from the left pyriform sinus. Transoral, CO2 laser assisted partial pharyngectomy was performed to incise the submucosa and excise the lesion. Following surgical removal, he was observed as an inpatient with serial swallow studies. He was discharged on the seventh postoperative day, tolerating a pureed diet and decannulated of his tracheostomy. One month postoperative followup exam revealed tolerance of a regular diet, no shortness of breath and endoscopy demonstrating a patent airway with minimal scar tissue. **Conclusions:** Lipomas of the hypopharynx are rare and few have been described in the literature. Transoral, CO2 laser assisted resection is a viable technique with few side effects and can be used for midsized tumors.

88. Primary Clear Cell Adenocarcinoma of the Head and Neck: A Population Based Analysis

Laith A. Mukdad, BA, Los Angeles, CA; Albert Y. Han, MD PhD, Los Angeles, CA; Karam W. Badran, MD, Los Angeles, CA; Jose E. Alonso, MD, Los Angeles, CA; Maie A. St. John, MD PhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the incidence and demographics of survival following the diagnosis of clear cell adenocarcinoma of the head and neck and demonstrate an understanding of major prognostic factors.

Objectives: To characterize the epidemiology and clinicopathologic determinants of survival following the diagnosis of clear cell adenocarcinoma (CCA) in the head and neck region. **Study Design:** Retrospective cohort study based on a national database. **Methods:** The Surveillance, Epidemiology, and End Results registry was reviewed for patients with CCA in the head and neck from 1973 to 2014. Study variables included age, sex, race, tumor subsite, tumor stage, regional and distant metastases. Survival measures included overall survival (OS) and disease specific survival (DSS).

Results: A total of 212 cases of CCA were identified. Mean age at diagnosis was 61.4 years; 48.1% were female; and 82.1% were white. 15.7% of patients presented with regional lymph node metastases, while 3.3% of patients presented with distant metastases. Most of the tumors presented in the salivary glands (37.0%), oral cavity (33.1%), and pharynx (21.8%). Kaplan-Meier analysis demonstrated OS and DSS of 52.7% and 80.3% at 5 years, respectively. Median survival after diagnosis was 153 months. Multivariable analysis showed that N stage was a predictor of OS (P = .026) and DSS (P = .007). Age was a predictor of OS (P = .010) but not DSS. **Conclusions:** CCA is a rare neoplasm that typically affects white individuals in their early 60s, with a generally favorable prognosis. It affects women and men at a nearly equal rate. It most commonly arises in the oral cavity, salivary glands, and pharynx. N stage is independently associated with worse OS and DSS when accounted for other factors.

89. Barriers to Thyroid Cancer Screening with Ultrasound in Patients with Familial Adenomatous Polyposis

Celeste Z. Nagy, MD, Atlanta, GA; Zachary A. Kelly, MD, Atlanta, GA; Steven A. Keilin, MD, Atlanta, GA; Field F. Willingham, MD MPH, Atlanta, GA; Amy Y. Chen, MD MPH, Atlanta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand that patients with familial adenomatous polyposis have a higher risk of developing thyroid cancer and therefore need annual thyroid ultrasound screening and lower threshold for fine needle aspiration for biopsy.

Objectives: To determine prevalence of thyroid cancer in patients with familial adenomatous polyposis (FAP) and identify barriers to care in patients that have not undergone the guideline for annual thyroid cancer screening with ultrasound. **Study Design:** Retrospective cohort study and survey. **Methods:** Patients with FAP seen at our institution were identified using ICD 9 and 10 codes. Patients underwent chart review for thyroid ultrasound and results recorded. Patients and healthcare providers then were surveyed to determine barriers to adherence to the guideline and opportunities for improvement in patient care. **Results:** We discovered that only 13 out of 35 patients surveyed (37%) had been told by a healthcare provider that ultrasound was recommended for thyroid cancer (TC) screening and had undergone ultrasound. The incidence for TC in FAP patients ranges from 1%-12%, while the general population risk is 0.02%-1%. In our series, 1 patient of 12 (8%) had TC which is consistent with prevalence in previous reports. Barriers to care included lack of patient education about risk of thyroid cancer in FAP, miscommunication among specialties as to which provider will order a thyroid US or refer the patient to a specialty that manages thyroid disease, and that patients that are enrolled in a FAP registry are more likely to undergo ultrasound for TC screening than those not enrolled. **Conclusions:** FAP patients are at a higher risk of developing thyroid cancer. Therefore, it is important for these patients to be informed and follow the recommended guideline to get a baseline thyroid ultrasound for screening as well as better patient education about risk of TC, improved communication among specialities, and patients that are enrolled in a FAP registry are more likely to undergo ultrasound for TC screening than those not enrolled.

90. The Role of Palliative/Curative Reirradiation in Persistent and Recurrent Head and Neck Squamous Cell Carcinoma

Hassan B. Nasser, MD, Los Angeles, CA; Kelly J. Pettijohn, MD, Los Angeles, CA; William C. Lorentz, MD, Los Angeles, CA; Vishad Nabili, MD, Los Angeles, CA; Marilene B. Wang, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss effects of using repeat radiotherapy in the treatment of persistent/recurrent head and neck squamous cell carcinoma.

Objectives: Patients with recurrent head and neck squamous cell carcinoma (HNSCC) have a grim prognosis, with estimated median overall survival of less than one year. Although historically considered excessively toxic, reirradiation has increasingly been used for salvage and palliative treatment. In this study we aim to analyze survival and quality of life outcomes in a cohort of patients with recurrent or resistant HNSCCC. **Study Design:** Retrospective chart review. **Methods:** Retrospective chart review of a cohort of patients at a VA hospital with recurrent HNSCC between 2009-2016. Overall survival and quality of life outcomes (gastrostomy/tracheostomy tube dependence, independent living) within an 18 month study period were assessed. **Results:** 42 patients met inclusion criteria, all received radiotherapy for their initial and recurrent cancer treatment. There was a significant improvement in overall survival of patients treated with surgery +/- chemoradiation vs. supportive care alone. Reirradiation in combination with chemotherapy trended towards improved survival but did not reach statistical significance. Analysis of quality of life outcomes found a beneficial association with independent living in patients treated with surgery +/- chemoradiation vs. supportive care. There was also benefit to chemoradiation vs. supportive care. There were no cases of RTOG grade 4/5 toxicities associated with reirradiation. **Conclusions:** Use of reirradiation alone or in combination with surgery and chemotherapy in the treatment of recurrent or residual HNSCC can be tolerable with acceptable toxicity in selected patients. Incorporation of reirradiation may result in improved independent living. While surgical salvage and chemoradiation does confer overall survival benefit, reirradiation and/or chemotherapy without surgery does not appear to improve survival.

91. Decreasing Pharyngocutaneous Fistula with Use of Fibrin Tissue Adhesive

Jaime J. Park, BA, Loma Linda, CA; Crystal H. Chang, BS, Loma Linda, CA; Khan K. Nguyen, MD, Loma Linda, CA; Daniel I. Kwon, MD, Loma Linda, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the physiology of surgical wound healing in laryngectomy and the potential role of fibrin tissue to help prevent wound healing.

Objectives: Pharyngocutaneous fistula and salivary leak has been extensively studied and represents significant morbidity and cost in head and neck cancer surgery. While these complications are unique, the principles of wound healing physiology are a highly orchestrated and well understood process. The purpose of this study is to apply a known growth factor process into improving wound healing in head and neck surgery. This study presents a patient series as well as the rationale for utilizing fibrin adhesives routinely in mucosal closures to prevent the rate of breakdown and leak. **Study Design:** Unique case series presentation and review of literature. **Methods:** This is an ongoing patient series of consecutive patients who have laryngectomy or comparable pharyngeal closure with a single surgeon. Activated fibrin tissue adhesive was incorporated in all patients along with standardized preoperative, operative, and postoperative care. Patients were followed through hospital stay as well as regular outpatient followup. Primary outcomes included pharyngocutaneous fistula or salivary leak as well as multiple other secondary patient and wound outcomes. **Results:** Fibrin tissue adhesive was successfully used in all patients and no leaks were reported. **Conclusions:** Fibrin tissue adhesive is a readily available and cost effective treatment that may improve pharyngocutaneous fistula.

92. Development of Ultrasound Induced Acoustic Imaging for Locating Tissue Boundaries

Peter A. Pellionisz, BS, Los Angeles, CA; Nikan K. Namiri, BS, Los Angeles, CA; Gregory M. Suematsu, BS, Los Angeles, CA; Yong Hu, PhD, Los Angeles, CA; Maie A. St. John, MD PhD, Los Angeles, CA; Warren S. Grundfest, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the development and application of an experimental imaging modality for locating macroscopic tumor boundaries.

Objectives: There is no accepted standard in imaging modality for the resection of oral cancer. Ultrasound induced acoustic emission uses two nondestructive low MHz tones to locally displace tissue through generation and detection of a (kHz) range radiation force. By raster scanning the focal point of the ultrasound beams an image may be generated of the spatially varying amplitude and phase elicited as a function of tissues' mechanical properties (i.e., elastic modulus and viscosity). The translational utility of this advanced technique is the imaging of deep tumor boundaries considering the increased stiffness of these neoplastic tissues. **Study Design:** Translational ex vivo study. **Methods:** We develop a mobile vibroacoustography system generating image contrast between tissue mimicking phantoms and ex vivo specimens with squamous cell carcinoma of the oral cavity to characterize the functionality of our system. The generated images are produced from the power of acoustic emission generated at each point of the sample. **Results:** The system resolution is 1mm laterally and 12mm axially. Our device is sensitive to homogeneous and heterogeneous materials of at least 4 mm in lateral width and 10 kPa difference in elasticity. Generated images of tissue boundaries correlate with quantitative measurements of tissue dimensions. **Conclusions:** These encouraging results suggest a novel application of vibroacoustography for noninvasive detection of deep tissue lesions and warrants further development. Future directions include a reduction of imaging duration permitting in vivo use and finalization of system design for both ex vivo and in vivo clinical trials.

93. Giant Sized Periosteal Osteosarcoma of the Head and Neck: Case Report and Literature Review

Peter A. Pellionisz, BS, Los Angeles, CA; Brooke M. Su, MD MPH, Los Angeles, CA; Keith E. Blackwell, MD, Los Angeles, CA; Maie A. St. John, MD PHD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the unique features of head and neck osteosarcoma and its management.

Objectives: Head and neck osteosarcoma (HNO) is a rare malignancy representing under 1% of cancers in the head and neck. Due to its rarity, the management of HNO is not standardized and varies among institutions. We detail a case and treatment of a patient with an unusually large (13.8cm) periosteal osteosarcoma, and review the literature for pertinent features and management of HNO. **Study Design:** Case report and literature review. **Methods:** We reviewed the case of a patient who developed HNO treated at a tertiary academic medical center and performed a meta-analysis of relevant literature. **Results:** A 46 year old patient with no known medical history presented to an outside emergency department complaining of dysphonia, dysphagia, and malnourishment due to a rapidly growing oral mass over the past 5 months. The patient was diagnosed with an inoperable tumor, received a tracheotomy and a gastrostomy tube, and was discharged for hospice. The patient presented to our institution seeking a second opinion. A diagnosis of chondroblastic osteosarcoma was confirmed through biopsy without evidence of metastases on imaging. Following an extensive multidisciplinary tumor board discussion, initial neoadjuvant chemotherapy followed by a composite mandibulectomy with a fibula free flap reconstruction was performed. **Conclusions:** Primary surgical resection for HNO has been shown to confer improved survival

over other treatment modalities. In contrast to conventional osteosarcoma, the majority of HNOs occur in the mandible and maxilla of adult patients with infrequent distal metastases yet with a high level of local recurrence. Earlier diagnosis and clear surgical margins are the principle prognostic factors associated with improved patient outcomes.

94. Outcomes Associated with Hurthle Cell Neoplasm on Fine Needle Aspiration of Thyroid Nodules

Cyrus C. Rabbani, MD, Indianapolis, IN; Henna D. Patel, BS, Indianapolis, IN; Michael W. Sim, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to adequately discuss and counsel patients on the risk of carcinoma associated with Hurthle cell neoplasms of the thyroid.

Objectives: Evaluate the outcomes of thyroid surgery following diagnosis of a Hurthle cell neoplasm on fine needle aspiration. **Study Design:** Retrospective review, single institution. **Methods:** Patients undergoing thyroid lobectomy or total thyroidectomy following fine needle aspiration of a thyroid nodule revealing a Hurthle cell neoplasm. Demographic information, ultrasound findings and surgical pathology was reviewed. Statistical analysis was performed utilizing chi-squared and Student's T-test. **Results:** A total of 166 were included in this study. 25 (15.7%) patients were diagnosed with carcinoma (15 Hurthle cell, 4 follicular, 4 papillary, 1 medullary, 1 well differentiated). 37 (22.2%) of all patients had occult papillary carcinoma on final surgical pathology. There were 39 males and 127 females. Men had a higher incidence of carcinoma (25.6% v. 11.8%, S2 = 4.46, p= 0.035). The age of men with carcinoma was also significantly higher than women (59.4 v 47.4 years, t = 2.46, p = 0.022). Carcinoma was found in 12 of the 81 patients that underwent a hemithyroidectomy and 12 of the 85 patients that underwent a total thyroidectomy. Of the patients with Hurthle cell carcinoma, 3 of the 13 (23.1%) patients with available pathology had corresponding contralateral carcinoma or regional spread of disease. **Conclusions:** The correct diagnostic and therapeutic pathway in Hurthle cell neoplasms requires thorough discussion and planning with the patient. A completion thyroidectomy should be offered to patients with Hurthle cell carcinoma. Ultrasonographic findings along with clinical features, including gender and age, may guide the analysis in selecting surgery for patients.

95. Prior Radiation Exposure Alters Airway Deformation during Laryngoscopy

Christiaan A. Rees, PhD, Hanover, NH; Joseph A. Paydarfar, MD, Lebanon, NH (Presenter); Xiaotian Wu, BE, Hanover, NH; Eric A. Eisen, MD, Hanover, NH; David A. Pastel, MD, Lebanon, NH; Ryan J. Halter, PhD, Hanover, NH

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the influence of radiation therapy on airway deformability and mandible/hyoid mobility in the setting of operative laryngoscopy.

Objectives: Assess the influence of prior radiation therapy on airway deformability during operative laryngoscopy. **Study Design:** Fifteen study subjects with suspected malignancies of the head and neck were enrolled, of which five had previously received radiation therapy to the upper aerodigestive tract (previously irradiated) and ten had no prior history of radiation therapy (nonirradiated). Airway deformability, as measured by pharyngeal airway volume and displacement of both the hyoid and mandible, were compared between groups. **Methods:** Subjects were imaged via computed tomography (CT) both before and during CT compatible laryngoscope insertion (un-instrumented and instrumented, respectively). CT images were used to reconstruct three dimensional representations of the pharyngeal airway, hyoid, and mandible. Pharyngeal airway volume, as well as translational and rotational motion of both the hyoid and mandible, was evaluated in both the instrumented and un-instrumented states. **Results:** In the instrumented state, pharyngeal airway volumes were significantly greater in nonirradiated subjects relative to previously irradiated subjects ($p = 0.002$). Overall translation of the mandible and hyoid were also significantly greater in nonirradiated subjects ($p = 0.02$ and $p = 0.01$, respectively), with the most substantial between group differences noted in the anterior posterior displacement of both the mandible and hyoid. Importantly, no significant between group differences were observed with respect to un-instrumented airway volume, age, BMI, gender, neck range of motion, or tumor stage. **Conclusions:** Individuals with prior radiation therapy to the upper aerodigestive tract differ from nonirradiated subjects with respect to airway deformation during laryngoscopy. Reduced airway deformability likely contributes to the difficulty associated with performing laryngoscopy in this patient population.

96. Use of Dental Extraction and Nonsurgical Airway Management in Early Cervical Necrotizing Fasciitis: A Report of 5 Cases

John P. Richards, MD, Tucson, AZ; Jonathan N. Young, MD, Tucson, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the early and aggressive management of cervical fasciitis with the aims to avoid the morbidity of surgical airway management.

Objectives: Cervical necrotizing fasciitis is a disease process with significant morbidity and mortality. Early diagnosis and management is critical for improving outcomes. Currently, there is no literature on using nonsurgical airway management and intraoperative dental extractions as management for early diagnosed cervical necrotizing fasciitis. **Study Design:**

Case report. **Methods:** Retrospective chart review of 5 subjects from a single tertiary care institution. Clinical presentation, demographics, imaging, surgical technique, hospital course and long term outcomes were all recorded for each case. **Results:** All 5 subjects received airway assessment on presentation to the emergency department to determine the approach for securing the airway perioperatively. In tenuous airway situations, transcervical airways were circumvented with a fiberoptically guided transnasal intubation. Three of the subjects underwent debridement intraorally and the remaining 2 subjects underwent debridement transcervically. The surgical approach was based on imaging results and extent of cervical spread. All 5 subjects received tooth extraction intraoperatively as indicated clinically and radiographically. None of the subjects had a need for surgical airway during their hospital stay. 2 subjects needed an additional washout in the OR. None of the subjects had recurrence at 1 month followup. **Conclusions:** Early diagnosis and management of cervical necrotizing fasciitis as well as careful airway assessment can prevent the need for a surgical airway. Intraoperative dental extraction can facilitate drainage of the affected area and minimize the need for multiple washouts in the operating room.

97. Autonomous Computed Guided Robotic Resection for Oropharyngeal Carcinoma: An Experimental Protocol

Hamed Saeidi, PhD, College Park, MD; Margaret Michel, BS, Washington, DC (Presenter); Justin Opfermann, PhD, Washington, DC; Jiawei Ge, MS, College Park, MD; Axel Krieger, PhD, College Park, MD; Arjun Joshi, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the feasibility of autonomous robotic tumor resection for oropharyngeal squamous cell carcinoma of the head and neck.

Objectives: Surgical treatment of head and neck carcinoma requires precise tumor resection since positive margins increase the risk of recurrence, while excessive margins may cause significant functional impairment. We propose an autonomous robotic tumor resection model to help standardize margins independent of location, size, and surgeon experience, and seek to apply it to the head and neck. **Study Design:** Expert surgeons using open, laparoscopic, and trained operators using robotically assisted (RAS) tissue cutting techniques were compared to autonomous tissue cutting with the Smart Tissue Autonomous Robot (STAR). Results were evaluated for mean error ± standard deviation, and maximum error from a referenced pattern. **Methods:** Porcine cadaver tissue was marked with the 5cm diameter circle from the Fundamentals of Laparoscopic Surgery task, and cuts were performed by either surgeons or STAR using an electrosurgical tool. Mean error and max error were defined as the average minimum, and absolute maximum deviations between the electrosurgical cut and circular pattern. **Results:** Mean error was 0.75±0.46 mm (N=4), 1.03±0.56 mm (N=4), 1.01±0.62 mm (N=1), and 0.91±0.56 mm (N=1) while max error was 2.05 mm (N=4), 2.57 mm (N=4), 2.59 mm (N=1), and 2.29 mm (N=1) for open, laparoscopic, RAS, and autonomous techniques respectively. **Conclusions:** Autonomous tissue cutting compares well to resections performed by experienced surgeons in porcine cadaver tissue. Future studies will demonstrate the benefits of autonomous tumor resection versus manual techniques for use clinically in the oropharynx.

98. Understanding Giant Cell Sarcoma of the Head and Neck: A Population Based Study

Rohan Sawhney, BA, Newark, NJ; Neel R. Sangal, BA, Newark, NJ; Lena A. Sheorey, BS, Newark, NJ; Soly Baredes, MD FACS, Newark, NJ; Richard Chan Woo Park, MD FACS, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss trends in incidence, demographic characteristics, clinicopathologic characteristics, treatment, and survival outcomes of giant cell sarcoma of the head and neck.

Objectives: To investigate the risk factors, epidemiology, and outcomes of giant cell sarcoma of the head and neck using a population based database. **Study Design:** Retrospective population based database analysis of the Surveillance, Epidemiology, and End Results (SEER) database. **Methods:** The SEER database was analyzed for all patients who have been diagnosed with giant cell sarcoma from 1973-2014. Data was collected on demographics, incidence, staging, extent of disease, differentiation, treatment, and survival outcomes. **Results:** 440 cases of giant cell sarcoma (GCS) of the head and neck were identified through the database. The investigation showed that the average age at diagnosis was 74.4 years, 86.8% were white, 82.5% were male, 70.7% were insured, and 88.2% lived in an urban metropolitan region. Subcutaneous tissue and muscle of the head and neck was the most frequent primary site (42.5%) and surgery alone was the most frequent mode of treatment (61.1%). The 5 year disease specific survival (5Y-DSS) rate was 91.1% while the 5 year overall survival rate (5Y-OS) was 54.6% for all cases. Patients treated with surgery alone had the highest 5Y-DSS rate of 94.5%. Significant differences in survival were observed in demographic characteristics and all clinicopathologic characteristics studied. T-stage was a significant predictor of survival accounting for confounding variables on multivariate analysis. **Conclusions:** GCS presents most frequently in subcutaneous tissue and muscle of the head and neck with overall high probability of survival (5Y-DSS of 91.1%). Our investigation revealed that the treatment of choice for GCS is surgery alone.

99. Management of Giant Hemifacial Plexiform Neurofibroma in a Resource Limited Setting

Sarek Alexander Shen, BS, La Jolla, CA; Aria Jafari, MD, San Diego, CA; Bharat A. Panuganti, MD, San Diego, CA; David M. Chan, MD, San Diego, CA; Bruce H. Campbell, MD, Milwaukee, WI; Susan R. Cordes, MD, Ukiah, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe clinical presentation and management of a patient with complex facial deformity resulting from giant hemifacial plexiform neurofibroma in a resource limited setting.

Objectives: Plexiform neurofibromas (PN) are rare, painless, benign neoplasms resulting from abnormal growth of peripheral nerve sheaths and surrounding connective tissue. The condition is pathognomonic for neurofibromatosis type 1 and lesions are most commonly found in the head and neck. Given this location, PNs can result in functional impairment and social stigma. Intervention is typically surgical, with the goal of improving quality of life through enhanced cosmesis and restoration of function. We present a case of giant hemifacial plexiform neurofibroma and discuss the sequential management in a resource limited setting. **Study Design:** Case report. **Methods:** A 32 year old female with progressive right sided facial deformity since childhood presented to a public hospital in Eldoret, Kenya. The patient described social isolation and impaired vision from right eye due to ptosis. Biopsy of the tumor revealed PN. She underwent subcutaneous debulking of the right malar and upper lip regions, restoration of nasolabial fold, and resection of excess skin. Two years later, she underwent upper and lower lid blepharoplasty, lateral canthal fixation, fascia lata sling, neck lift and alar base reduction. **Results:** The patient reported significant functional and cosmetic improvement and enhanced quality of life after sequential, staged reconstructive surgeries. **Conclusions:** PNs are rare, benign tumors with potentially significant functional and cosmetic consequences. Surgical intervention is the mainstay of treatment, with emphasis on improved cosmesis and restoration of function. Sequential, staged reconstructive procedures with close followup may be successful in the treatment of this condition. Further research is necessary to establish consistent surgical approaches, indications for treatment, and timing of intervention, particularly in a resource limited setting.

100. Oculopharyngeal Muscular Dystrophy: A Rare Genetic Disorder

Rebekah C. Smith, BA, Los Angeles, CA; Christopher G. Tang, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the presenting symptoms of a patient with oculopharyngeal muscular dystrophy, explain how this condition affects patient daily life, discuss possible treatments for such a disorder, and compare this case to patients having the same or similar disorders.

Objectives: To discuss a unique case of oculopharyngeal muscular dystrophy (OPMD) presenting with ptosis and dysphagia. **Study Design:** A case report with review of literature. **Methods:** A 64 year old male presenting to the neurology department with bilateral ptosis, dysphagia with both solid and liquids, dysarthria, and extremity weakness and incoordination. Patient was referred to the department of head and neck surgery for dysphagia management. Patient's father has 4 brothers, two of which are affected with OPMD. **Results:** Genetic testing revealed 8 GCG repeats suggestive of an expanded allele in the PABP2 gene, consistent with OPMD. **Conclusions:** OPMD is a genetic disorder caused by an expanded allele of GCG repeats in the PABP2 gene. Muscular dystrophies with a clear genetic origin should be included in the differential diagnosis of patients with dysphagia and trouble swallowing as it is one of the hallmarks for OPMD.

101. Under-Utilization of Treatment in Elderly Patients with Laryngeal Cancer

Kaitlyn F. Strickland, MD, Baltimore, MD; Carole Fakhry, MD MPH, Baltimore, MD; Karen T. Pitman, MD, Baltimore, MD; Wayne M. Koch, MD, Baltimore, MD; David W. Eisele, MD, Baltimore, MD; Christine G. Gourin, MD MPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss factors associated with lack of treatment in elderly patients with larynx cancer.

Objectives: Elderly patients are less likely to receive treatment for cancer. We sought to identify factors associated with lack of treatment in elderly patients with larynx cancer. **Study Design:** Retrospective analysis of Surveillance, Epidemiology, and End Results (SEER) Medicare data. **Methods:** Patients diagnosed with local and regional larynx cancer from 2001-2009 comprised the study population. Variables associated with treatment were evaluated using multivariate regression and survival analysis. **Results:** Of 4,741 patients, 10.2% received no treatment. Hospice was used in the first 180 days after diagnosis in 17.0% of untreated patients, compared with 2.8% of treated patients. On multivariate analysis, lack of treatment was more likely for patients with supraglottic (OR=1.7 [1.3-2.1]) and subglottic (OR=2.7 [2.0-3.7]) disease, black race (OR=2.2 [1.7-3.0]), male sex (OR=2.2 [1.6-3.0]), divorced/separated marital status (OR=2.4 [1.8-3.2]), rural location (OR=1.5 [1.1-2.0]), and early hospice entry (OR=8.1 [5.7-11.4]), and less likely for patients in the top median income quintile (OR=0.6 [0.4-0.9]) and with advanced comorbidity (OR=0.5 [0.4-0.7]). In untreated patients, early hospice care was more likely for patients with age over 80 years (OR=2.4 [1.4-4.1]), and less likely for males (OR=0.4 [0.2-0.7]) and patients in rural locations (OR=0.4 [0.2-0.9]). Treatment was significantly associated with survival, with worse survival

in patients who did not receive treatment (HR=2.5 [2.2-2.8]). **Conclusions:** In elderly patients with nonmetastatic larynx cancer, treatment is associated with improved survival. Socioeconomic factors appear to underlie disparities in treatment, suggesting targets for further investigation and intervention.

102. 3D Exoscope vs Microscope for Microvascular Anastomosis: A not so Steep Learning Curve

Warren C. Swegal, MD, Baltimore, MD; Suhael Momin, MD, Detroit, MI; Tamer Ghanem, MD PhD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the learning curve associated with the use of a 3D exoscope vs standard microscope for the use in microvascular anastomosis.

Objectives: To assess the effects of using a 3 dimensional (3D) exoscope on procedure time for microvascular anastomosis and to examine the learning curve associated with new users. **Study Design:** Prospective control comparison trial. **Methods:** Three surgeons of different experience levels performed timed microvascular anastomoses using a standard microscope and a 3D exoscope. Each participant completed 5 anastomoses with each system using a standardized technique and 2 mm artificial vessels. Vessels were examined after completion for patency. Time to completion was compared between systems for each surgeon using a Wilcoxon matched pair signed rank test. **Results:** Each surgeon completed 5 vessels for each system with all vessels (30/30) demonstrating complete patency at the end of the trial. For the microscope, the mean procedure times were 14:42 (SD 1:06), 15:17 (SD 2:15), and 9:39 (SD 0:42) for surgeons A, B, and C respectively with surgeon C being significantly faster than surgeons A and B (p=0.009). For the 3D exoscope, the mean time was 17:31 (SD 5:27), 16:24 (SD 2:10), and 13:08 (SD 6:06) with surgeon C being faster than surgeon A (0.039). On head to head comparison between surgeons, the two technologies were similarly timed (A p=0.188, B p=0.13, C 0.125). **Conclusions:** In this small trial, there was no difference in time to complete the microvascular anastomosis between the microscope and 3D exoscope. The high variability in times for the 3D exoscope was likely due to its novelty. However, the rapid decrease in times over the 5 procedures indicates that it was adopted quickly.

103. Demographic and Clinicopathologic Factors Impacting Nodal Involvement in Oral Cavity Cancers at Time of Diagnosis

Eve C. Swirski, BA, Newark, NJ; Neel R. Sangal, BA, Newark, NJ; Richard Chan Woo Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize that certain specific demographic and clinicopathologic traits are predictive or protective of nodal involvement in oral cavity cancers, as well as the significance of varying nodal involvement in oral cavity cancers.

Objectives: To assess associations between demographic and clinicopathologic factors and varying nodal involvement at time of diagnosis in oral cavity cancers. **Study Design:** Retrospective cohort study. **Methods:** The Surveillance, Epidemiology, and End Results (SEER) database was queried for cases of oral cavity cancers from 1973-2014 (N=24,769). Chi-squared, frequency analyses, and nominal regression models were used to determine predictors of nodal involvement in oral cavity cancers. **Results:** These cases were stratified into those presenting with nodal involvement (N=7,956; 32.1%) and without nodal involvement (N=16,812; 67.9%). Nominal regression of demographic and clinicopathologic variables revealed that specific primary sites and female gender (HR: 0.777; 99% CI: 0.731-.0825) were protective of nodal involvement. Predictive factors included specific races and primary sites. Additionally, single marital status (HR: 1.301; CI 99%: 1.228 -1.379), poorly differentiated tumor (grades III-IV) (HR: 2.265; CI 99%: 2.105-2.438), and insurance status, namely, being uninsured (HR: 1.248; CI 99%: 1.039-1.498) or having Medicaid (HR: 1.356; CI 99%: 1.211-1.517) were all predictive, as well. Reinforcing the utility of determining nodal involvement in oral cavity cancers, 10 year disease specific survival (10Y-DSS) and 10 year overall survival (10Y-OS) showed statistically significant differences (all p-values<0.001) between N0 and N1-N3 (N0: 10Y-DSS=72.2%, 10Y-OS=49.5%; N1-N3: 10Y-DSS=35.7%, 10Y-OS=22.5%). **Conclusions:** The demographic and clinicopathologic factors identified that are associated with nodal involvement at time of diagnosis in oral cavity cancers include race, gender, marital status, insurance status, and primary tumor location. These traits may have utility in patient screening and predicting mortality.

104. Supraclavicular Island Flap Used in the Surgical Repair of Tracheoesophageal Fistula and Esophageal Stricture

John T. Symms, MD, Tucson, AZ; Audrey H. Baker, MD, Tucson, AZ; Samuel S. Kim, MD, Tucson, AZ

Educational Objective: At the conclusion of this presentation, the participants should demonstrate an understanding of the vascular anatomy and geometry of the supraclavicular island flap. They should discuss potential applications of the supraclavicular island flap and specific modifications for its use in reconstruction of tracheal or esophageal defects.

Objectives: Tracheoesophageal fistula and esophageal stricture are anatomic abnormalities causing significant alimentary dysfunction and chronic respiratory morbidity. Supraclavicular island flap is widely used for reconstruction of cutaneous defects of the head and neck. Its geometry is also suitable for reconstruction of pharyngeal and esophageal defects, although these applications are infrequently reported. We report our experience with this flap in repair of tracheoesophageal fistula and esophageal stricture. **Study Design:** Retrospective case review. **Methods:** Subjects included adult (n=3)

patients from a single tertiary care institution. Patient demographics, clinical presentation, treatment, and hospital course were recorded. Patients were surveilled postoperatively for persistence of fistula or esophageal leak with CT imaging, fluoroscopy and bronchoscopy. Outcomes reported include time to radiographic resolution, time to resumption of oral diet and perioperative complications. **Results:** Average age at diagnosis was 39 years. Average age at definitive repair was 42 years. All patients were female. All patients resumed an oral diet. Average time to radiographic resolution was 38 days (range=[5,102]). Average time to resumption of oral diet was 41 days (range=[8,102]). One patient required prolonged enteral feeding and NPO status while awaiting radiographic resolution of persistent esophageal extravasation. Delayed resumption of oral intake was associated with type 2 diabetes (1/3), ESRD (1/3), and failure of prior open surgical repair (1/3). Complications included surgical site abscess (1/3), vocal fold paresis (1/3), and donor site wound breakdown (1/3). **Conclusions:** The supraclavicular island flap is a useful adjunct in the surgical treatment of tracheoesophageal fistula and esophageal stricture.

105. Robot Assisted Sialolithotomy with Sialoendoscopy for Large Submandibular Gland Sialoliths: A Review of Safety, Efficacy and Cost

Alex J.F. Tampio, MD, Syracuse, NY; Mark Marzouk, MBBCH, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the many advantages of robot assisted sialolithotomy with sialoendoscopy for large submandibular gland hilar sialoliths compared to combined approach sialolithotomy which include a greater procedure success rate, lower rate of lingual nerve damage, and shorter mean operative times which may account for a notable savings in cost.

Objectives: Review the safety, efficacy and cost of robot assisted sialolithotomy with sialoendoscopy (RASS) for large submandibular gland hilar sialoliths. **Study Design:** Retrospective chart review. **Methods:** Patients 18 years and older with the diagnosis of submandibular hilar sialolithiasis between 1/1/15 and 7/31/2018 who underwent RASS were identified. Sialolith size, number of sialoliths, procedure success, postoperative complications, procedure duration, and costs associated with the procedure were reviewed. **Results:** 33 patients fit inclusion criteria. 93.9% of patients had successful sialolith removal. Mean sialolith size was 8.9 mm. 15.2% had transient tongue paresthesia. 0% had permanent tongue paresthesia compared to a 2% rate of lingual nerve damage cited in the literature for combined approach sialolithotomy (CAS). The average total cost was $17,476. Insurance paid >90%, 70-89.9%, 40-69.9% of the expected reimbursement in 61%, 19% and 13% of patients respectively. 7% of patients self-paid. Compared to CAS, the cost of reusable robotic arms and drapes totaled $475 though these costs were included in the standardized operative cost per minute and were not forwarded to the patient. The mean procedure time was 61 minutes. Compared to published mean procedure times for CAS, the reduced operative time may account for a savings of $2,552-$4,576 not including anesthesia cost per minute. **Conclusions:** RASS is a safe modality for submandibular hilar sialolith removal with a high success rate, low risk for temporary tongue paresthesia and lower rate of permeant lingual nerve damage compared to CAS. Compared with CAS, RASS may result in a net reduction of operative room costs given its shorter procedure time.

106. Submental Flap Practice Patterns and Complications: A Survey of AHNS Surgeons

Liyang Tang, MD, Los Angeles, CA; Andrew T. Day, MD MPH, Dallas, TX; Daniel G. Deschler, MD FACS, Boston, MA; Urjeet Patel, MD, Chicago, IL; Kevin S. Emerick, MD, Boston, MA; Jeremy D. Richmond, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe the advantages and disadvantages of the submental flap (SMF); 2) characterize the factors associated with increased perceived SMF complications; and 3) compare perceived SMF complications with the complications of more commonly used flaps, including the radial forearm free flaps and pectoralis major flap.

Objectives: To describe submental flap (SMF) practice patterns amongst surgeon members of the American Head and Neck Society (AHNS) and to evaluate variables associated with SMF complications. **Study Design:** Cross-sectional study. **Methods:** An online survey was distributed to 782 AHNS surgeons between 11/11/16 and 12/31/16. Surgeon demographics, training, practice patterns and techniques were characterized and evaluated for associations with frequency of SMF complications. **Results:** Among 221 AHNS surgeons, 108 (48.9%) reported performing SMFs, of whom 86 provided complete responses. Most SMF surgeons routinely reconstructed oral cavity defects with the flap (86.1%, n=74) and fewer routinely reconstructed cutaneous (39.5%, n=34), parotid (33.7%, n=29) and oropharyngeal (22.1%, n=19) defects. Thirty-seven surgeons (43.0%) experienced very few complications with the SMF flap. Univariate analysis demonstrated associations between surgeon location (US vs international, $p = 0.002$), total career number of SMFs ($p=0.02$), and routine reconstruction of parotid ($p=0.04$) and oropharyngeal ($p<0.001$) defects and very few versus more than very few complications. Fewer surgeons perceived very few complications with the SMF (n = 37, 43%) compared to the pectoralis major (n = 50, 58%, $p = 0.005$) and the radial forearm free flaps (n = 44, 66%, $p = 0.01$). Among 94 surgeons not performing SMFs, 71.3% reported interest in a SMF training course. **Conclusions:** Practice patterns of surgeons performing SMFs are diverse, although most use the flap for oral cavity reconstruction. While 43% of surgeons performing the SMF reported very few complications, overall complication rates with the SMF were perceived as higher compared to other flaps, warranting further investigation. Increased training opportunities in SMF harvest and inset are indicated.

107. Outcomes of Single Stage Integra Graft Reconstruction of Scalp Defects after Oncologic Resection

Vanessa F. Torrecillas, MD, Salt Lake City, UT; Jason P. Hunty, MD, Salt Lake City, UT; Luke O. Buchmann, MD, Salt Lake City, UT; Richard B. Cannon, MD, Salt Lake City, UT; Marcus M. Monroe, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to engage in discussion the options for reconstruction of complex scalp defects after oncologic resection. They should be able to compare different methods of reconstruction and their outcomes.

Objectives: The purpose of this series is to characterize the appropriate patient population for single stage Integra reconstruction of complex scalp defects from oncologic resection. Success rate and safety for this novel use of Integra are evaluated. **Study Design:** Retrospective review of a single institution. **Methods:** A retrospective study was conducted at a cancer institute from 2013-2017 in patients who underwent reconstruction after oncologic resection of scalp malignancies. 35 total cases were identified. 11 patients underwent single stage Integra reconstruction. Patient demographics, treatment and defect characteristics, time to epithelialization, and reconstructive outcomes for these patients were investigated. **Results:** The 11 cases of single stage Integra reconstruction comprised 10 (91%) males and 1 (9%) female. The median age was 82 (38-90 years old). Median defect size was 40 cm2 (5-95 cm2). Depth of the defect extended to bony calvarium in 10 out of 11 patients (91%). No patients required postoperative adjuvant radiation therapy (<0.0001). 1 patient developed early recurrence requiring additional procedures so was excluded from further analysis. 3 (27%) patients had incomplete Integra graft take. 6 (73%) patients had full take with no complications and showed complete epithelialization in 6 months or less. **Conclusions:** Single stage Integra reconstruction can be a safe and successful alternative to reconstruct complex scalp defects that might otherwise require free or local tissue transfer. In many patients, graft take is complete and epithelialization occurs in 6 months or less. The most desirable patient population for this type of reconstruction is likely elderly men who do not desire hair regrowth and do not require adjuvant radiation therapy.

108. Intraoperative Methylene Blue Use and Risk of Postoperative Complications in Head and Neck Microvascular Reconstruction

Prem B. Tripathi, MD, Irvine, CA; Benjamin Bitner, BS, Irvine, CA; Govind Rajan, MD, Irvine, CA; Tjoson Tjoa, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the impact of intraoperative methylene blue (MB) as a vasopressor on microvascular free flap viability in head and neck oncologic reconstruction.

Objectives: Complications associated with intraoperative use of vasopressors during head and neck microvascular reconstruction remains controversial. The aim of this study is to evaluate the postoperative outcomes associated with intraoperative use of vasopressor methylene blue (MB) during free flap reconstruction. **Study Design:** Retrospective chart review. **Methods:** The effects of intraoperative vasopressor utilization were evaluated in patients undergoing microvascular reconstruction of head and neck defects at a single academic institution from September 2016 to June 2018. Outcomes included flap revision, surgical site infection, and length of hospitalization. **Results:** 54 patients were included: 7 received MB intraoperatively, 35 received other pressors and 12 patients received no vasopressors. Flaps included: 35 radial forearm, 8 fibula, 7 anterolateral thigh, 2 latissimus dorsi, and 1 iliac crest, of which 36 were clean contaminated and 18 were clean. The mean length of stay (LS) was 12.35 days, length of surgery (LOS) was 578 minutes, and surgical site infection (SSI) rate was 33%. On univariate analysis, intraoperative use of MB compared to other pressors or no vasopressors was not associated with vascular thrombosis (p=.8313, p=.2155), SSI (p=.0671, p=.2556), or increased LS (p=.2261, p=.2749). Comparing use of any vasopressor to no vasopressor, there was no increased risk of SSI (p=.2976), or LS (p=.4392). Use of all vasopressors, which included MB, did demonstrate increased association with flap revision (p=.0329) when compared to no vasopressor use. **Conclusions:** Methylene blue may be a safe agent for intraoperative use during microvascular reconstruction. Larger sample size and multivariate analysis are ongoing to further evaluate this association.

109. The Effects of Cervical Compression Garment Therapy on Symptomatic Laryngeal Edema in Head and Neck Cancer Patients Treated with Radiation: A Pilot Study

Andrew G. Tritter, MD, Shreveport, LA; Patrick T. Spiller, BS, Shreveport, LA; Melanie L. Brown, CCC-SLP, Shreveport, LA; Paul M. Weinberger, MD, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the potential utility of compressive garment therapy for post-radiotherapy lymphedema in head and neck cancer patients treated with external beam radiation.

Objectives: Compression garment therapy (CGT) is a well established treatment for post-radiotherapy lymphedema, and its use in head and neck patients is becoming more common for treatment of the external manifestations of this condition. Effects on internal laryngeal edema, as well as its associated symptoms of dysphagia and dysphonia, however, have yet to be studied. **Study Design:** Retrospective review with prospective data collection. **Methods:** We surveyed 7

patients treated with external beam radiation for head and neck cancer who were also prescribed CGT for their cutaneous cervical lymphedema. Patients were asked to answer the EAT-10 and VHI-10 with regards to their symptoms both at present and prior to CGT. Laryngoscopy videos from these periods were also reviewed and scored using a validated tool for assessing laryngopharyngeal edema. **Results:** 85% of subjects reported at least some improvement in dysphagia and dysphonia following CGT. Average pre- and post-treatment EAT-10 scores showed significant improvement after CGT (22.4 and 11.4, p = 0.014). Average pre- and post-treatment VHI-10 scores showed an improvement after CGT, however, this result was not significant (17.4 and 8.7, p = 0.155). Laryngeal edema on endoscopic exam was not significantly different after at least 3 months of therapy (pre: 20.15, post: 20.21, p = 0.975), however, this result is limited by a markedly low inter-rater reliability (Krippendorff alpha = 0.513). **Conclusions:** While we are unable to show any difference in objective assessment of laryngeal edema on endoscopy in this pilot study, patients report substantial subjective improvement in dysphagia and dysphonia following cervical CGT.

110. Dyskeratosis Congenita: The Increased Risk of Early Development of Oral Squamous Cell Carcinoma

Spencer D. Uetz, MS4, Grand Forks, ND; Alan W. Johnson, MD, Grand Forks, ND

Educational Objective: At the conclusion of this presentation, the participants should become more familiar with a rare genetic disorder that predisposes patients to a higher incidence of head and neck squamous cell carcinoma.

Objectives: Describe a case report of a patient with dyskeratosis congenita, a rare genetic disorder that is associated with an increased incidence of oral leukoplakia and an increased risk of carcinoma. **Study Design:** Case report. **Methods:** A 31 year old man with DC presented to the clinic with a raised, hyperkeratotic lesion on the left hard palate. His past history included recurrent oral leukoplakia biopsied 4 times with no malignancy on histopathology and bone marrow transplant (BMT) with subsequent immunosuppression for idiopathic aplastic anemia. An excisional biopsy of the new lesion revealed superficially invasive, well differentiated squamous cell carcinoma (SCC) with verrucous features. **Results:** Mucosal leukoplakia of the oral cavity occurs in up to 80% of cases of DC and the incidence of malignant transformation to SCC is significantly higher than the general population. The ratio of observed to expected head and neck SCC (O/E) was 74 times greater in patients with DC compared to the general population. Bone marrow failure (BMF) is another common presenting symptom of DC and it is estimated that 70% of patients will develop a component of BMF by age 60. Only one other case of head and neck SCC has been described in a patient with DC who underwent BMT. **Conclusions:** In DC patients, oral leukoplakia presents at an unusually young age but the appearance and location are like the general population. Ultimately, a high degree of suspicion and a low threshold for biopsy are necessary due to the high and unpredictable rate of malignant transformation in patients with DC.

111. Unplanned Readmission after Total Laryngectomy

Swar N. Vimawala, BS, Philadelphia, PA; Michael C. Topf, MD, Philadelphia, PA; Adam J. Luginbuhl, MD, Philadelphia, PA; Richard A. Goldman, MD, Philadelphia, PA; David M. Cognetti, MD, Philadelphia, PA; Joseph M. Curry, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the factors affecting unplanned readmission within 30 days after a total laryngectomy.

Objectives: To determine the rate of unplanned readmission after total laryngectomy (TL), and to determine which patient or surgical factors increase the likelihood of readmission. **Study Design:** Retrospective chart review. **Methods:** Retrospective chart review of all patients who underwent TL at a single academic center from April 2007 through August 2016. Primary outcome was unplanned readmission to the hospital within 30 days of discharge. Univariable and multivariable logistic regression were performed to identify risk factors for unplanned readmission. **Results:** 278 patients met inclusion criteria. 29 patients (10.4%) had unplanned readmissions within 30 days. The most common reasons for readmission were pharyngocutaneous fistula (n=14), neck abscess (n=4), wound breakdown (n=4). Average time to unplanned readmission was 11.2 days (range 0-27 days). History of cardiac disease was the only variable independently associated with an increased risk of 30 day unplanned readmission on multivariate analysis with an OR = 4.36 (95% CI, 1.12-19.83, P = 0.04). Of the patients that were readmitted and recommended for adjuvant therapy, 9/12 (75%) patients were delayed in starting adjuvant therapy defined as >50 days from date of TL. **Conclusions:** Unplanned readmission occurs in a small but significant number of TL patients. Patients who have a 30 day unplanned readmission may be at risk for a delay in initiation of adjuvant therapy.

112. Relationship of Mass and Volume of Parathyroid Adenoma with Parathyroid Hormone Levels

Emily L. Waddick, BS, Shreveport, LA; Rafay Q. Soleja, MD, Shreveport, LA; Ameya A. Asarkar, MD, Shreveport, LA; Tara N. Moore-Medlin, BS, Shreveport, LA; Cherie-Ann O. Nathan, MD FACS, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the relationship of parathyroid adenoma mass and volume with parathyroid hormone levels and apply this to the management of patients with hyperparathyroidism due to a single parathyroid adenoma.

Objectives: To study the relationship of parathyroid adenoma weight and volume with intraoperative parathyroid hormone levels (iPTH) in patients with primary hyperparathyroidism. **Study Design:** Retrospective chart review. **Methods:** IRB approved retrospective study of patients who underwent a single gland parathyroidectomy with iPTH for primary hyperparathyroidism from January 2011 - present. Data collected included preoperative PTH, iPTH, preoperative serum calcium, and adenoma weight. Volume was calculated using the formula for volume of an ellipsoid object. **Results:** 92 patients (81 female, 11 male) with an average age of 53 ± 14 met inclusion criteria for this study. On univariate analysis, mass ($p<0.0001$) and volume ($p=0.0054$) showed a significant positive correlation with preexcision iPTH, while density ($p=0.8395$) did not show a significant correlation with preexcision iPTH. Mass ($p=0.0115$) and volume ($p=0.05$) showed a significant positive correlation with Ca++, while density ($p=0.6466$) did not show a significant correlation with Ca++. **Conclusions:** A direct correlation between adenoma mass and volume and preexcision PTH and preoperative Ca++ was found. This correlation may help the surgeon get a sense of adenoma size prior to operation and guide surgical decisions.

113. Core Needle Biopsy versus Fine Needle Biopsy in Salivary Glands: Complication Rate and Diagnostic Accuracy

Edward M. Walton, BS, Detroit, MI; Amy M. Williams, PhD, Detroit, MI; Iyaka J. Awata, MD MS, Detroit, MI; Steven S. Chang, MD, Detroit, MI; Christian E. Keller, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) evaluate the rationale of choosing between FNA and CNB; and 2) weigh the risks and benefits of CNB.

Objectives: Ultrasound guided core needle biopsy (CNB) is used to assess liver and breast masses. In the head and neck, fine needle aspiration (FNA) is the standard of care with a reported sensitivity of 89.5% and rate of nondiagnostic aspirates between 3-30%. Despite its higher specificity for malignancy compared to other modalities, CNB is not commonly used in the diagnosis of head and neck masses. Concerns regarding the safety and value of CNB in high risk regions for nerve injury, such as the parotid, have been reported, however have not been robustly studied. **Study Design:** Retrospective cohort study. **Methods:** This retrospective study includes 90 patients who underwent salivary gland biopsy. The results of the CNB and FNA results were compared to the pathologic diagnosis of the resection specimen. **Results:** CNB of salivary gland masses had no complications, similar to FNA. In our cohort of 90 patients, 33 (36%) had FNA and 66 (73%) CNB. Of the 66 CNB, 3 had recurrence of disease; an incidence of 4.5%. Our study had 9 FNA that were later biopsied using CNB prior to removal of the mass. One of these was identified as a malignant neoplasm by FNA, but was later found to be benign. Three of these FNA biopsies were nondiagnostic. The most common diagnosis was pleomorphic adenoma, consistent with the literature. **Conclusions:** These preliminary results cast doubt on the concerns of complication often associated with CNB. Based on these results, CNB may better predict tumor biology than FNA, with a similar safety profile.

114. Different Approaches to Palliative Management of Thyroid Carcinomas

Joseph S. Weisberger, MS, Newark, NJ; Marcus L. Elias, BS, Newark, NJ; Chris B. Choi, BS, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard Chan Woo Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to compare differences in survival among different palliative treatment modalities in the management of thyroid carcinomas.

Objectives: To investigate the effectiveness of palliative treatment modalities in the management of thyroid carcinoma. **Study Design:** Retrospective database review. **Methods:** The National Cancer Database (NCDB) was queried for all thyroid carcinomas between 2005 and 2015 (n=313,692). Only cases with palliative treatment and complete staging data were included (n=1049). Survival analysis of palliative treatment and clinicopathologic factors were analyzed using Kaplan-Meier curves and Cox Proportional Hazard Models. **Results:** The cohort was comprised of mostly stage IV (90.6%), followed by stage I (5.2%), stage II (2.4%) and stage III (1.8%) carcinomas. Analysis of palliative treatment revealed radiation to be the most common modality (62.2%), followed by surgery (14.5%), combination of multiple modalities (13.8%), chemotherapy (9.4%). Upon Kaplan-Meier analysis mean overall survival was 2.96 years (std, 0.153). Palliative surgery was associated with the highest mean survival rate (5.46 yr, std 0.46) followed by radiation (2.54 yr, std 0.16), combination therapy (2.23 yr, std 0.36) and chemotherapy (1.71 yr, std 0.33). Further analysis using Cox Proportional Hazard Models-controlling for significant clinicopathologic variables-there was no significant difference in overall survival rates between modalities. A subset analysis of anaplastic carcinoma (n=299) revealed radiation as the most commonly used modality (57.5%) followed by chemotherapy (16.7%), combination therapy (13.4%), and surgery (12.4%). Using Cox Proportional Hazard Models, surgery (HR=1.99, $p=0.007$) was associated with decreased overall survival rates when compared to patients undergoing other palliative modalities. **Conclusions:** Although comfort is the ultimate goal of palliative therapy, palliative surgery should be avoided in patients with anaplastic thyroid carcinoma who desire increased survival. However, surgery remains a viable option for palliative management of all other thyroid carcinomas.

115. Prognostic Value of T and N Stage in Advanced Cutaneous Squamous Cell Carcinoma of the Head and Neck

Angela W. Zhu, MPhil, Miami, FL; Samuel Trosman, MD, Miami, FL; Zoukaa Sargi, MD, Miami, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to relate T and N stage, as well as other pathologic features, to disease recurrence and clinical outcome in patients with advanced cutaneous head and neck cancer requiring parotidectomy and cervical node dissection.

Objectives: To review the pathologic features of advanced cutaneous squamous cell carcinoma of the head and neck (HNcSCC) and describe their relationship to clinical outcome in a single institution series. Patients with HNcSCC who underwent parotidectomy with cervical node dissection from 2011-2016 were studied. We examined the ability of T and N stage (based on the new American Joint Committee on Cancer (AJCC) 8th Edition TNM staging for HNcSCC) to stratify clinical outcomes in this cohort. **Study Design:** 5 year retrospective study. **Methods:** We used the Kaplan-Meier method to investigate overall survival (OS) and progression free survival (PFS). Log rank tests and univariate Cox proportional hazard models were performed to correlate tumor stage and pathologic features to survival. **Results:** Of 104 patients, 48 had at least 1 positive cervical lymph node. Mean age of diagnosis was 68 years. The median number of positive lymph nodes was 2. In the node positive cohort, 5 year OS and PFS was 78% and 55%, respectively. However, increasing N stage did not correlate significantly to worse OS or PFS. Meanwhile, increasing T stage is significantly associated with decreased PFS (p=0.0042) but not OS (p=0.1). Presence of perineural invasion, lymphovascular invasion, and margin status are also significantly associated with decreased PFS. **Conclusions:** Increasing T stage is associated with worse PFS. In our small cohort, we did not appreciate statistically significant differences in survival based on cervical lymph node status. Additional pathologic features not included in the AJCC 8th edition of TNM staging were also associated with statistically significant decreases in PFS.

LARYNGOLOGY/BRONCHOESOPHAGOLOGY

116. Burden of Allergic Disease and Laryngopharyngeal Reflux in Dysphonia Patients

Cynthia R. Duck, JD, Louisville, KY; Heather E. Lee, MD, Rochester, NY; Liz L. Cash, PhD, Louisville, KY; Kevin R. Potts, MD, Louisville, KY; Swapna K. Chandran, MD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the burden of allergic disease and laryngopharyngeal reflux among patients presenting with dysphonia.

Objectives: Dysphonia patients may experience a higher burden of allergic symptoms and laryngopharyngeal reflux. Allergy and reflux symptoms may overlap and worsen dysphonia. **Study Design:** Prospective observational study. **Methods:** A sample of 46 patients with dysphonia completed the Voice Handicap Index (VHI-10), Reflux Symptom Index, and allergy survey (ARIA). A subgroup completed treatment for dysphonia (operative, n=10; vs nonoperative n=17) and reported voice and reflux symptoms at followup (M=5.6 months). Operative strategies included TVF injections, DL/bronchoscopy with excision, dilation, and/or laser; while nonoperative strategies included antifungals, PPIs, voice therapy, and/or GI workup. **Results:** Half (52.2%) reported allergic rhinitis though only 10.9% scored above ARIA clinical cutoff. Pre-treatment reflux correlated with allergy (r=.374, p=.015) and VHI (r=.400, p=.009) across all patients, but only with allergy scores (r=.475, p=.046) in the nonoperative group, and only with VHI (r=.711, p=.032) in the operative group when examined separately. VHI decreased significantly among operative (pre-treatment M=22.0, post-treatment M=13.4; t=2.769, p=.022) but not nonoperative patients (pre-treatment M=17.9, post-treatment M=16.4; p>.05). Changes in VHI were associated with changes in reflux in the operative group (r=.770, p=.015). Post-treatment VHI was significantly related to reflux both pre- (r=.599, p=.018) and post-treatment (r=.764, p=.001) in the nonoperative group. Pre-treatment allergy scores did not correlate with changes in voice or reflux over time. **Conclusions:** There is a lower than expected allergy burden in dysphonia patients. Dysphonia may be more strongly related to reflux than allergy symptomatology. Treatment may influence associations between reflux and allergy and the impact of each on dysphonia.

117. Computational Fluid Dynamics Evaluation of Pediatric Laryngotracheal Stenosis

Michael E. Dunham, MD, New Orleans, LA; Tyler W. Crosby, MD, New Orleans, LA (Presenter); Keith A. Gonthier, PhD, Baton Rouge, LA; William J. Poynot, BS, Baton Rouge, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand computational fluid dynamics analysis of airway stenosis.

Objectives: Define the aerodynamic changes in pediatric laryngotracheal stenosis. **Study Design:** Image based three dimensional reconstruction of the laryngotracheal airway and computational fluid dynamics. **Methods:** A three dimensional computer model of the laryngotracheal airway lumen was created using the cervicothoracic CT scan of a 10 year 6 month old female. The base model was deformed in software to simulate 0%, 25%, 50%, and 75% laryngotracheal stenosis based on diameter reduction in the subglottic space. Laryngotracheal aerodynamics of the models were evaluated with computational fluid dynamics. **Results:** Directional flow velocity analysis shows flow separation at low levels of

stenosis. Downstream flow direction and velocities persist up to 50% stenosis. Stenosis jet formation and turbulent flow dominate the aerodynamics at stenoses greater than 50%. High velocity jet formation and substantial disruption of downstream flow appear at the 75% level. There is a nonlinear reduction in volumetric flow with increasing levels of stenosis. Luminal pressures required to maintain constant maximal inspiratory flow show a substantial increase in the upstream to downstream pressure gradient at 50% stenosis. The pressure gradient at 75% stenosis is 10 times the gradient at 50% stenosis. The total area of shearing stress downstream from the stenosis is substantially increased at 75% stenosis. **Conclusions:** Laryngotracheal stenosis produces several aerodynamic changes in the upper airway. We hypothesize that ineffective ventilation, downstream reactive airway changes, mucosal injury and ineffective airway clearance may be predicted by the aerodynamic effects of laryngotracheal stenosis.

118. Laryngeal Blastomycosis in a Young Male with Cystic Fibrosis: A Case Report and Systematic Review of the Literature

Abhinav R. Ettyreddy, MD, Saint Louis, MO; Laura R. Marks, MD, St. Louis, MO; Joseph P. Bradley, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the clinical presentation, pathologic findings, and management of patients with laryngeal blastomycosis.

Objectives: To review the literature pertaining to laryngeal blastomycosis in the setting of a young male with cystic fibrosis, bilateral vocal fold immobility with airway obstruction, and ulcerative, friable vocal fold masses. **Study Design:** Case report and review of the literature. **Methods:** A comprehensive English literature search was undertaken using PubMed, EMBASE, SCOPUS, and WOS with the key words blastomycosis and laryngeal or laryngoscopy. Individual patient data was abstracted from the case reports/series into a separate data sheet and analyzed for trends. **Results:** A total of 34 individual patient cases were identified from 20 unique publications spanning 1915-2011. Mean age at presentation was 53.1 years with a male to female ratio of 4.2:1. The most common presenting symptoms were dysphonia (97%), dyspnea (38%), and cough (38%). Twenty-four percent of patients presented with acute airway obstruction and 30% required a tracheotomy. All patients received an indirect laryngoscopy exam which demonstrated laryngeal inflammation with variable degrees of ulceration. Forty-eight percent had impaired vocal fold mobility with 38% of those having bilateral involvement. Five patients were treated for suspected carcinoma with radiation (n=4) and/or laryngectomy (n=2). The average reported time from initial medical evaluation to initiation of appropriate antifungal treatment was 11.8 months. All patients treated with appropriate antifungal therapy were able to recover with minimal residual symptoms. **Conclusions:** The relatively rare incidence of primary laryngeal blastomycosis often leads to a delay in diagnosis and inappropriate management. Biopsy with careful evaluation of pseudoepitheliomatous hyperplasia for fungus should prompt initiation of antifungal therapy to prevent further downstream complications.

119. Laryngeal Force Sensor Metrics Are Predictive of Increased Perioperative Narcotic Requirements

Allen L. Feng, MD, Boston, MA; Alex Ciaramella, BSc, Boston, MA; Shekhar K. Gadkaree, MD, Boston, MA; Iuliu Fat, MD, Boston, MA; Phillip C. Song, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of a novel force sensor in predicting perioperative narcotic requirements from laryngeal surgery.

Objectives: To determine the relationship between force metrics measured by the laryngeal force sensor (LFS) during suspension microlaryngoscopy (SML) and perioperative narcotic requirements. **Study Design:** Prospective observational study. **Methods:** The LFS is a novel force sensor designed for use during microphonosurgery. Patients were prospectively enrolled and had force metrics recorded throughout each procedure including maximum force, average force, suspension time, and total impulse. Narcotic administration in the intraoperative period and postanesthesia care unit (PACU) were also recorded and converted into IV morphine equivalents (ME). Surgeons were blinded to the force recordings during surgery to prevent operator bias. **Results:** 82 patients completed the study. Of these patients, the mean perioperative ME requirement was 16.96 mg (range: 0.15 79.82 mg). Univariate analysis demonstrated a positive correlation between perioperative narcotic requirements and total suspension time ($p < 0.001$) as well as total impulse ($p = 0.007$). A positive correlation was also seen with maximum force, although not significant. On multiple linear regression, total suspension time was a significant predictive variable for perioperative narcotic use, with a marginal incremental increase of 0.273 mg of ME per minute of total suspension time (0.273 mg/min, 95% CI: 0.040 - 0.507 mg/min, $p = 0.022$). **Conclusions:** LFS force metrics including total suspension time are predictive of increased perioperative narcotic requirement after SML. Total impulse and maximum force experienced during SML may also be correlated with increased perioperative narcotic requirements.

120. The Heterogeneity of the Location of Optimal Medialization in Type I Laryngoplasty

Mark R. Gilbert, MD, Nashville, TN; Sarah M. Tittman, MD, Nashville, TN; David O. Francis, MD MS, Madison, WI; Kimberly N. Vinson, MD, Nashville, TN; Alexander R. Gelbard, MD, Nashville, TN; C. Gaelyn Garrett, MD, Nashville, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the heterogeneity of the location of optimal maximal medialization in type I laryngoplasty.

Objectives: Carved implants for type I laryngoplasty have been advocated for their ability to customize medialization for optimal voice for individual patients. However, there is little data to support the need to adapt to a wide variety of medialization locations via intraoperative assessment and fine tuning of implants. We examined heterogeneity in location of optimal medialization to support customization, versus preformed, non-customizable implants. **Study Design:** Retrospective case series. **Methods:** A retrospective study was performed on all unilateral type I laryngoplasties using carved silastic medialization between March 2007 and February 2017 at our laryngology clinic. Clinical records and operative reports were reviewed for window and implant measurements, focusing on the location of maximal medialization. Type I laryngoplasties that did not include documentation of maximal medialization measurements or window location and dimensions, or for which these could not be calculated, were excluded. **Results:** 192 unilateral laryngoplasties were identified; 110 patients were female and 82 were male. Maximal medialization measurements for women were: average distance from midline 11.7mm (sd 4.0, range 6-18.5mm), average height from inferior thyroid border 3.3mm (sd 1.3, range 0.5-6.5mm), and average depth 5.1mm (sd 0.7, range 3-8mm). Corresponding measurements for men were anterior distance 14.3mm (sd 5.0, range 6-24mm), height 4.0mm (sd 1.4, range 1-9mm), and depth 5.2mm (sd 0.9, range 3-8mm). **Conclusions:** There is significant heterogeneity in the optimal location of maximal medialization for type I laryngoplasty, demonstrating the value of intraoperative customization of implants for individual patients.

121. Functional Total Laryngectomy: Impact on Quality of Life

Scott R. Hall, MD, Phoenix, AZ; Jeffrey C. Mecham, BS, Phoenix, AZ; David G. Lott, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the impact functional laryngectomy has on quality of life.

Objectives: It is estimated that 5-11% of total laryngectomies performed in the United States are done for organ dysfunction, termed functional total laryngectomy (FTL). Despite this, little has been written about the effect this has on quality of life (QOL). In this study, we aim to evaluate the impact on quality of life of this major elective surgery with life altering effects. **Study Design:** A cross-sectional analysis of FTL patients was performed using the MD Anderson Dysphagia Index (MDADI), University of Washington Quality of Life Index (UW-QOL), and the 12 Item Short Form Healthy Survey (SF-12) version 2. **Methods:** Patients were asked to fill out the survey based on their preoperative and postoperative symptoms. Finally, they were asked if they would elect to do it again. **Results:** A total of 8 out of 15 patients met inclusion criteria, were able to be contacted, and were willing to participate in the study. There was no significant difference between global preoperative and postoperative QOL scores as measured by any of the three questionnaires used. When broken down by individual questions, there was a significant decrease in appearance scores ($p=0.03$) and a significant increase in swallow scores after FTL as measured by the UW-QOL ($p=0.008$). Six of the eight patients stated that they would elect to undergo FTL again. **Conclusions:** Functional total laryngectomy appears to have a neutral effect on QOL with some areas improving and others worsening. This is important information to discuss when counseling patients with endstage dysphagia.

122. The Laryngeal Tongue: A Case Report and Literature Review of Laryngeal Oncocytic Papillary Cystadenoma

William T. Hines, BS, Los Angeles, CA; William Z. Gao, MD, Los Angeles, CA; Chandnish Ahluwalia, MD, Los Angeles, CA; Michael Johns, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, differential diagnosis, and treatment of laryngeal oncocytic papillary cystadenoma.

Objectives: To report an unusual case of laryngeal oncocytic papillary cystadenoma presenting concurrently with polypoid corditis. **Study Design:** Case report with literature review. **Methods:** Retrospective chart review, pathology consultation, and PubMed literature search were performed. **Results:** A 60 year old woman with longstanding history of smoking and low pitched voice was referred for progressive vocal deterioration, hemoptysis, exertional dyspnea, and intermittent vomiting after an upper respiratory infection. Laryngeal videostroboscopy demonstrated bilateral polypoid corditis and an elongated polypoid lesion emanating from the right ventricle causing intermittent partial glottic obstruction. Suspension microlaryngoscopy with surgical excision and KTP laser treatment was recommended and performed. Surgical histopathology and secondary review confirmed oncocytic papillary cystadenoma. On short term followup, the patient endorsed significant improvement in her voice and resolution of her other symptoms. **Conclusions:** Laryngeal oncocytic papillary cystadenoma is an extremely uncommon but benign entity. Given that multifocal disease, recurrence, and malignant

transformation have been reported, albeit rarely, recommended treatment entails surgical excision with followup.

123. Hemi-Laryngopharyngeal Spasm (HELPS): Defining a New Clinical Entity

Amanda Hu, MD FRCSC, Vancouver, BC Canada; Murray D. Morrison, MD FRCSC, Vancouver, BC Canada; Christopher R. Honey, MD, DPhil, FRCSC, Vancouver, BC Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) list defining characteristics of hemi-laryngopharyngeal spasm (HELPS); and 2) recognize the signs and symptoms of this clinical entity.

Objectives: To establish the diagnostic criteria for the recently recognized syndrome of hemi-laryngopharyngeal spasm (HELPS) caused by vascular compression of the 10th cranial nerve at the cerebellopontine angle. **Study Design:** Case series. **Methods:** Retrospective chart review of five women and one man presenting to otolaryngology and neurosurgery at a tertiary care academic center from July 2013 to July 2017. **Results:** Five defining characteristics were seen in HELPS patients: 1) All patients had symptoms of episodic laryngospasm and choking. Five patients developed stridor and four developed nocturnal symptoms. All patients were completely asymptomatic between episodes. Patients did not respond to speech therapy or reflux management. 2) All patients had episodic coughing triggered by a holding sensation deep to the suprasternal notch. 3) Patients given preoperative botulinum toxin A injections into the thyroarytenoid muscle on the ipsilateral side of symptoms all reported reduced choking, but no change in coughing. 4) Magnetic resonance imaging of the head uniformly revealed ipsilateral neurovascular conflict between the vagus nerve rootlets and posterior inferior cerebellar artery. All patients underwent microvascular decompression (MVD) surgery, and all patients had complete or near complete resolution of their symptoms. One patient had milder ongoing symptoms that required further botulinum toxin A injections. 5) In-office laryngoscopy showed hyperactive twitching of the ipsilateral vocal fold in two of the six patients. No other defining signs on laryngoscopy were seen. **Conclusions:** A diagnostic criteria for HELPS is proposed. Recognition of this new clinical entity will avoid misdiagnosis and lead to appropriate and timely curative management.

124. A Safe and Effective Management Algorithm for the Critical Airway Due to Acquired Tracheal Stenosis in Adults

Jacob B. Kahane, MD, Las Vegas, NV; Nathaniel Reeve, MD, Las Vegas, NV; Caleena Longworth, BS, Las Vegas, NV; Laruan Evans, BS, Las Vegas, NV; Robert C. Wang, MD, Las Vegas, NV

Educational Objective: At the conclusion of this presentation, the participants should be able to effectively utilize the described method for the management of acute acquired tracheal stenosis in adults.

Objectives: We describe a reliable and effective method for the surgical management of the critical airway resulting from acquired subglottic tracheal stenosis (SGS) in adults. **Study Design:** A one year retrospective case series of adult patients with subglottic stenosis after percutaneous tracheostomy or prolonged intubation. **Methods:** Patients with critical SGS were managed by immediate direct laryngoscopy using the Dedo laryngoscope under apnea without attempted intubation beyond the stenotic segment. GI balloon dilators were passed into the stenotic segment under direct visualization and inflated to 18-20mm diameters. Endotracheal intubation was then performed through the rigid laryngoscope with a 6.0 endotracheal tube. The patients were extubated and again dilated to 20mm with the GI balloon prior to awakening from anesthesia. No cuts were made in the airway and no attempt at intubation beyond the stenosis was made until after the first dilation. **Results:** Eight patients presented with critical stenoses after prolonged intubation or percutaneous tracheostomy in the study time frame. All underwent the above procedure. There were no adverse events, and no patients required replacement of tracheostomy. Three patients required continuation of their existing tracheostomies. Two patients required subsequent dilations using the same technique. Five patients had disruptions of the anterior tracheal cartilages noted on imaging or during laryngoscopy. **Conclusions:** Balloon dilation under apnea prior to attempted intubation is a safe, atraumatic, and fast method of mechanical dilation in adult acquired SGS.

125. Is a Voice Specific Quality of Life Questionnaire more Predictive of Laryngoscopy/Stroboscopy Findings than Common Clinical Queries?

Elliana R. Kirsh, BM BS, Boston, MA; Thomas L. Carroll, MD, Boston, MA; Jennifer J. Shin, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand that the VHI-10 is an effective predictor of laryngoscopy/stroboscopy findings of vocal fold paralysis and laryngeal stenosis, as compared to mainstream queries about vocal characteristics.

Objectives: To evaluate the ability of a disease specific quality of life instrument (VHI-10) to predict vocal diagnoses made via laryngoscopy/stroboscopy, as compared to common clinical inquiries about vocal characteristics. **Study Design:** Correlation analysis of prospective cohort data. **Methods:** Consecutive adults presenting to a laryngology subspecialty clinic completed the Voice Handicap Index-10 (VHI-10) and 16 concurrent mainstream queries to specify vocal characteristics such as weak, breathy, prone to fatigue, or inability to shout. Assessments were designed to determine the area under the receiver operating characteristic curves (AUC) and calculation of sensitivity/specificity. **Results:** For vocal fold paralysis, the VHI-10 score demonstrated an AUC of 0.78 (95% CI 0.70, 0.86). Common clinical queries overall had less diagnostic

capacity: weak voice AUC 0.54 (95% CI 0.40, 0.67), voice prone to fatigue AUC 0.47 (95% CI 0.34, 0.61), inability to shout AUC 0.68 (95% CI 0.57, 0.80). At a threshold score of >10, VHI-10 sensitivity is 86.7%; at a threshold of >30, specificity is 95.1%. For laryngeal stenosis, the VHI-10 score demonstrated strong discrimination: AUC 0.90 (95% CI 0.77, 1.00), while vocal characteristics queries had an AUC of 0.78 (95% CI 0.75, 0.82) for weak voice and 0.67(95% CI 0.64, 0.71) for strained voice. At a threshold score of >10, VHI-10 sensitivity is 100.0%; at a threshold of >30, the specificity is 94.2%. Both VHI-10 scores and vocal characteristic queries demonstrated low diagnostic ability for paradoxical vocal fold motion (PVFM) and laryngopharyngeal reflux (LPR). **Conclusions:** The VHI-10 is an effective predictor of laryngoscopy/stroboscopy findings of vocal fold paralysis and laryngeal stenosis, as compared to mainstream queries about vocal characteristics.

126. Systematic Review and Meta-Analysis of Surgery for Pediatric Laryngotracheal Stenosis

Nikita V. Kohli, MD, Brooklyn, NY; Hamid R. Arjomandi, MD, Brooklyn, NY; Richard M. Rosenfeld, MD, MPH, Brooklyn, NY; Joshua B. Silverman, MD PhD, New Hyde Park, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the existing data regarding open and endoscopic surgery for pediatric laryngotracheal stenosis and be able to counsel their patients and families with respect to surgical success rates and need for further surgery.

Objectives: To determine outcomes after open or endoscopic surgery for pediatric laryngotracheal stenosis regarding decannulation and need for further surgery. **Study Design:** Systematic review and meta-analysis. **Methods:** We performed a systematic review using PubMed, EMBASE, and CINAHL databases. We included English language articles studying children aged 0-18 undergoing surgery for laryngotracheal stenosis. We excluded studies with isolated tracheal stenosis or stent; small sample size; and those not assessing decannulation. Dual independent investigators assessed eligibility, bias risk using MINORS criteria, and extracted data. Results were pooled using a random effects model of meta-analysis. **Results:** We reviewed 1,386 abstracts of which 44 studies with 2,578 patients met criteria. Treatment modalities included balloon dilation (BD), single and double staged laryngotracheal reconstruction (LTR), cricotracheal resection (CTR), and combined LTR/CTR. Meta-analysis yielded an overall 84% decannulation rate (95% confidence interval (CI), 80-88%, I2 84%) and 34% reoperation rate (95% CI, 27-42%, I2 86%). CTR was most successful with an 88% decannulation rate (CI 82-92%, I2 47%) and 18% reoperation rate (95% CI 13-27%, I2 52%). Similar success was observed among single and double staged LTRs and BD. Combined LTR/CTR was associated with a higher 57% reoperation rate (95% CI 7-96%, I2 96%). Limitations include high heterogeneity and limited data indicating the type of surgery performed for the stenosis grade. **Conclusions:** Patients undergoing CTR have the highest decannulation rates and lowest reoperation rates although similar success was observed among LTR and BD. Additional comparative studies are needed to determine the optimal decannulation method based on circumferential and length of stenosis accounting for comorbidities.

127. Endoscopic Findings in Prepubertal Boy Choir Singers

David R. Lee, MD, Cincinnati, OH; Barbara Weinrich, PhD, Cincinnati, OH; Wendy Leborgne, PhD, Cincinnati, OH; Stephanie Zacharias, PhD, Cincinnati, OH; Christopher Eanes, PhD, Cincinnati, OH; Alessandro de Alarcon, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the endoscopic laryngeal findings of male prepubertal singers.

Objectives: The male singing voice through puberty undergoes many changes that present challenges for the singer and choral director. The purpose of this study is to discuss the endoscopic findings seen in prepubescent boy choir singers. **Study Design:** Single institution prospective study. **Methods:** All subjects were recruited from the local boy choir, and were described as Cooksey stage unchanged or midvoice I. History was obtained via questionnaire at the initial visit. Subjects with known laryngeal pathologies were excluded. All endoscopic laryngeal examinations were performed using videoendoscopy. During examination, each subject sang four discrete frequencies. The findings of the endoscopic exam were judged by a pediatric otolaryngologist and two speech pathologists focusing on voice disorders. **Results:** We evaluated 28 subjects prior to vocal maturation. Their age range was 8 - 13 years old (mean=10.2±1.2). All 28 were self described as soprano. The subjects had a mean of 1.7±1.1 years in the boy choir (0-5 years). None reported history of vocal issues or voice problems in the past; 7 (25%) subjects had bilateral vocal cord lesions seen at one or more frequencies; 26 (93%) subjects had a posterior gap at one or more frequencies. **Conclusions:** Our study aimed to describe the laryngeal examination of dedicated boy choir singers prior to undergoing pubertal development and vocal maturation. Interestingly, 7 subjects were found to have laryngeal pathology that was previously unknown and that was asymptomatic. This suggests that asymptomatic lesions are not uncommon in boy choir singers and may suggest that this can also be seen in the general population.

128. Laryngeal Botox Injections for Treatment of Chronic Ulcerative Laryngitis
Sara W. Liu, MD, Cleveland, OH; Paul C. Bryson, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate a role for laryngeal Botox injections in the treatment of refractory chronic ulcerative laryngitis.

Objectives: Chronic ulcerative laryngitis can be difficult to manage and often is refractory to conservative therapy. This case report describes a novel indication for Botox induced voice rest for recalcitrant ulcerative laryngitis. **Study Design:** Case report. **Methods:** A 39 year old woman presented for laryngology evaluation for severe dysphonia. On flexible laryngoscopy with videostroboscopy, bilateral vocal fold ulcers were identified with marked reduction in mucosal pliability. She had minimal improvement of hoarseness with conservative therapy including complete voice rest, removal from work environment, subepithelial steroid injections, systemic steroids, and fluconazole. However, the ulcerative lesions were persistent. Patient was taken to the operating room for microdirect laryngoscopy and biopsy. Pathology showed acute and chronic inflammation, and culture was negative. She was offered laryngeal Botox for voice rest. Botox was injected into bilateral thyroarytenoids with confirmation by electromyogram. **Results:** No organisms were identified on microbial and fungal cultures. Steroid injected pre-dated Botox by 6 weeks and pre-Botox exam revealed no change in appearance or pliability. Laryngeal Botox injections to the bilateral adductor compartments were performed. After laryngeal Botox injections, followup at one and two month intervals demonstrated significant improvement in voice and progressive resolution of vocal fold ulcers. Patient tolerated the Botox injections well and did not report any prolonged side effects. Mucosal pliability returned to near normal. **Conclusions:** Chronic ulcerative laryngitis refractory to standard therapies can be difficult to treat. In these patients, there may be a role for chemically induced, aggressive voice rest via bilateral thyroarytenoid Botox injections.

129. The New Normal: Subjective Voice Measures Following Type I Thyroplasty in Patients with Unilateral Vocal Fold Motion Impairment
Emily C. Malik, MS CCC-SLP, Seattle, WA; Simon R. Brisebois, MD MSc, Sherbrooke, QC Canada (Presenter); Lisa A. D'Oyley, MS CCC-SLP, Seattle, WA; Margaret M. Naunheim, MD, Seattle, WA; Albert L. Merati, MD, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the extent of improvement in subjective voice measures following type I thyroplasty for unilateral vocal fold motion impairment.

Objectives: Unilateral vocal fold motion impairment (UVFMI) is a common etiology for dysphonia in laryngology clinics. Framework surgery has shown efficacy as a treatment option for UVFMI. This study sought to determine the extent of improvement in subjective voice outcome measures following type I thyroplasty for UVFMI. **Study Design:** This is a retrospective study. **Methods:** A chart review of patients who have undergone type I thyroplasty by a single surgeon for UVFMI diagnosed by videostroboscopic evaluation. All patients with concurrent secondary vocal pathology were excluded. Available pre and postoperative voice outcome measures (VHI-10 and CAPE-V) were obtained. **Results:** Fifty-three patients were included for review. Most patients were female (62.3%) with a mean age of 63.4 (SD +/- 14.5) years old. In the majority of cases, a complete paralysis (71.7%) was diagnosed. The mean pre and postoperative VHI-10 scores were respectively 27 (SD +/- 8) and 15 (+/- 11). For the CAPE-V, the scores were respectively 47 (SD +/- 22) and 23 (SD +/- 15) before and after surgery. For both scores, a statistically significant difference was found ($p < 0.001$). **Conclusions:** Type I thyroplasty in patients with UVFMI is associated with significant improvement in subjective voice measures. Despite this improvement, the results indicate that patients' voices still may not be perceived as normal following surgery as measured by abnormal ranges on the VHI-10 and mild to moderate severity ratings on the CAPE-V postoperatively. Further analysis of subcomponents of each score will be performed to better characterize how surgery impacts voice.

130. Management of a Laryngeal Venous Malformation via Nd:YAG Laser and Bleomycin Sclerotherapy
Sayan Manna, BS, New York, NY; Annika Meyer, MD, New York, NY; Alejandro Berenstein, MD, New York, NY; Mark Courey, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the treatment of vascular malformations with Nd:YAG laser and bleomycin sclerotherapy.

Objectives: Literature describing Nd:YAG photocoagulation and sclerotherapy for laryngeal venous malformations (VMs) is sparse. Here we present a case in which an extensive laryngeal VM in a 28 year old female was managed successfully through a combination of serial Nd:YAG laser photocoagulation and bleomycin injections. **Study Design:** A description of the case and subsequent management is provided followed by an analysis of the current literature regarding treatment of laryngeal VMs. **Methods:** Over the course of two years, the patient underwent four laser photocoagulation sessions, a prophylactic tracheostomy, and four bleomycin injections. Emphasis was placed on the intraluminal component of the lesion to decrease laryngeal obstruction. **Results:** The treatment plan resulted in noticeable lesion ablation, mucosalization and significant improvement in symptoms. At no point during treatment course did the patient experience any adverse events including swelling, bleeding or airway obstruction. **Conclusions:** VMs can be managed through a variety

of treatment modalities, so a combinatorial approach is often indicated. To our knowledge, this case is the first instance of bleomycin injection specifically into a laryngeal VM reported in the English medical literature. This case illustrates that Nd:YAG photocoagulation and bleomycin sclerotherapy is a safe and effective option for treating VMs in the larynx.

131. Role of Pepsin in Epithelia Mesenchymal Transition in Subglottic Stenosis

Alec J. McCann, BS, Milwaukee, WI; Tina L. Samuels, MS, Milwaukee, WI; Joel H. Blumin, MD, Milwaukee, WI; Nikki Johnston, PhD, Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to rebut a role for pepsin in subglottic stenosis via induction of an epithelia mesenchymal transition.

Objectives: Pepsin has been shown to be present in subglottic mucosa of patients with idiopathic subglottic stenosis (iSGS), absent in normal mucosa. The goal of this study was to investigate a potential causal role of pepsin in SGS. The epithelia mesenchymal transition (EMT) is known to play a significant role in the development of scarring and fibrosis. The specific aim was to document the effect of pepsin on EMT in the larynx as this relates to scarring and SGS. **Study Design:** In vitro translational research study. **Methods:** Human laryngeal epithelial cell cultures, established from a biopsy procured from the subglottic region of a patient with no inflammatory/neoplastic disease, were exposed to 0.1 mg/ml or 1.0 mg/ml pepsin at pH7 and pH5 for 4, 24, and 48 hours, and EMT markers measured by qPCR and ELISA. Immortalized human vocal fold fibroblasts were exposed to 0.1 mg/ml or 1.0 mg/ml pepsin at pH7 and pH5 for 24 hours pre or post-wounding. Fibroblasts were wounded by an IncuCyte WoundMaker and imaged in an IncuCyte Live Cell Analysis System for 24 hours to assess cell migration and proliferation. **Results:** There was no change in expression via qPCR of MMP1, MMP9, FN1, COL1A1, HAS2, or CDH1. ELISA demonstrated no change in matrix metalloproteinase 9 or fibronectin levels. Pepsin had no effect on fibroblast migration. **Conclusions:** While pepsin has been shown to be present in the subglottic mucosa of patients with iSGS, this in vitro study does not support a causal role for development of fibrosis in subglottic epithelial cell cultures.

132. A Patient with Two Tracheas? Transglottic Stenosis Diagnosed Intraoperatively: Case Report and Review of the Literature

Kevin A. Moore, MD, Shreveport, LA; Paul M. Weinberger, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the existence of a spectrum of posterior glottic and glottic stenosis as well as the challenges these conditions can present to the practicing otolaryngologist.

Objectives: 1) Present a case of a patient with a complex medical and surgical history who was found intraoperatively to have a transglottic stenosis in the form of mucosal web; 2) review pertinent literature regarding posterior glottic, glottic, and subglottic stenosis as well as any previous cases similar to our own; and 3) highlight important clinical pearls regarding management of these often complex patients. **Study Design:** Case report and review of available literature. **Methods:** Review of chart of patient presenting to tertiary care academic medical center with complaint of dysphonia and difficulty breathing. PubMed/MESH database search using terms glottic stenosis , posterior glottic stenosis , transglottic stenosis , laryngostenosis , and combined airway stenosis . **Results:** We present a case of a patient with complex medical and surgical history who was thought initially to have posterior glottic stenosis, but was found intraoperatively to have a thick transglottic mucosal web extending from supraglottis to subglottis, essentially creating a dual laryngeal lumen. No similar cases were found in existing literature. **Conclusions:** Laryngeal stenosis is a well established disorder, with risk factors noted in the literature including larger endotracheal tube size, diabetes, and prolonged intubation. Multiple treatments have been described; in our case, a combination of coblator, cold instrumentation, and balloon dilation resulted in ablation of the web and significant symptomatic improvement for the patient.

133. Evidence of Nonresponse to OnabotulinumtoxinA in Spasmodic Dysphonia Patients

Jamie L. Rashty, BS, Detroit, MI; Diana N. Kirke, MD, New York, NY; Andrew Blitzer, MD DDS, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the possibility of nonresponse to onabotulinumtoxinA in spasmodic dysphonia patients.

Objectives: To determine the nonresponse rates and possible contributing factors in patients receiving onabotulinumtoxinA injections for treatment of spasmodic dysphonia (SD). **Study Design:** Case series and literature review. **Methods:** All SD patients presenting to a clinical research center from March 1998 to March 2018 who stopped responding to botulinum toxin (BoNT) treatment were included. A total of 5 patients were identified. Each patient's BoNT treatment history was analyzed, including the dates of injection and dosage used. The primary outcome measure assessed was the average time on BoNT treatment before nonresponse. **Results:** Of the five patients, four patients had adductor type (ADSD) and 1 had abductor type SD (ABSD). There were 4 females and 1 male with an average age of 60.6±7.0 years (range 50-69 years). The average time spent on BoNT before experiencing nonresponse was 68.24 months (range 8.27-192.73 months). The average dose received was 3.3 U (range 0.5 U-7 U). **Conclusions:** While nonresponse to BoNT therapy has been identi-

fied in cervical dystonia, blepharospasm and cosmetic medicine, this is the first time it has been identified in the literature in those being treated for SD. In this subset of patients, nonresponse did not appear until 5.6 years on average. We recommend that SD patients presenting for BoNT administration be made aware of the possibility of resistance developing, and the various components that may contribute to it.

134. Transient Bilateral Vocal Fold Paralysis after Laryngeal Mask Airway

Saranya Reghunathan, MD, Cleveland, OH; William S. Tierney, MD MS, Cleveland, OH; Paul C. Bryson, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to acknowledge the laryngeal mask airway (LMA) as a rare cause of bilateral vocal fold paralysis due to presumed neurapraxia on the recurrent laryngeal nerve and clinical risk factors for this unusual complication.

Objectives: Highlight the LMA as potential cause of bilateral vocal fold paralysis and its clinical relevance. **Study Design:** Case report and review of literature. **Methods:** Patient chart analysis and literature review. **Results:** A diabetic patient presented with a foot fracture. After failing conservative management, he was taken to the operating room with podiatry for fixation under general anesthesia, with use of LMA for airway management. Following surgery, the patient reported dysphonia and aspiration of thin liquids. Flexible fiberoptic laryngoscopy profound glottic insufficiency with bilateral vocal fold immobility. Due to ongoing dysphagia and dysphonia, the patient pursued injection laryngoplasty. Two months after initial injury, the patient was noted to have a near normal voice with recovery of vocal fold motion and complete glottic closure. **Conclusions:** The LMA is not a conventional etiology of vocal fold paralysis with only 3 reports of this in the literature. However, certain patient comorbidities may lead to increased risk. Review of this case and the literature reveals that all nerve paralyses have returned function with time, suggesting a neuropraxia of the recurrent laryngeal nerve as the etiology. As such, otolaryngologists should be aware of this potential dilemma and how to effectively manage the temporary sequelae.

135. Vocal Cord Paralysis Associated with Multiple Sclerosis

Maya M. Samman, San Francisco, CA; Christopher G. Tang, MD FACS, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand unique cases of vocal cord paralysis in patients with multiple sclerosis.

Objectives: To discuss a unique case of vocal cord paralysis associated with multiple sclerosis (MS). **Study Design:** A case report with review of literature. **Methods:** A 57 year old male with a history of MS initially presented to the head and neck surgery clinic with laryngeal candida. One month after presentation, patient developed new left vocal cord paralysis. **Results:** Computed tomography scan of the neck did not reveal any masses or abnormalities along the path of the recurrent laryngeal nerve. Patient's voice improved after vocal cord injection augmentation and voice therapy. **Conclusions:** Although MS was first described in 1964 to be a cause of vocal cord paralysis, a focal vocal cord deficit is rare and there have been only 5 articles regarding this subject matter. We describe a case of vocal cord paralysis associated with a central nervous system demyelinating disease and review the literature on such etiology.

136. Primary Herpes Simplex virus Supraglottitis Presenting as Acute Airway Obstruction: Report of a Case and Review of Literature

Sarek Alexander Shen, BS, La Jolla, CA; Aria Jafari, MD, San Diego, CA; Peter J. Martin, MD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe clinical presentation and management of viral supraglottitis with acute airway obstruction and compare the differences between viral etiologies of viral laryngitis.

Objectives: Primary herpes simplex virus (HSV) supraglottitis is a rare cause of acute upper airway obstruction. Literature review demonstrates nonspecific symptom duration and acuity. Here, we present a case of acute HSV supraglottitis and describe other etiologies of viral supraglottitis. **Study Design:** Case report with review of the literature. **Methods:** A 69 year old male presented with 8 hours of progressive dysphagia, odynophagia and respiratory distress. Transoral examination revealed uvular edema and the patient was taken emergently to the OR. Flexible laryngoscopy revealed severe right pharyngeal and supraglottic edema and ecchymosis. After intubation, direct laryngoscopy also demonstrated several pustular lesions within the tonsillar parenchyma. The patient was treated for presumed angioedema and bacterial supraglottitis. He was extubated next day. One week later, the patient reported resolution of symptoms, but mild edema and pustular lesions within the right tonsil persisted. Biopsy demonstrated HSV infection. **Results:** Literature review was performed. 6 cases of HSV1, 4 cases of VZV, and 1 case of parainfluenza associated laryngitis were reported. Symptom duration ranged from 1 day to 3 months; odynophagia, dysphonia, and cough were the most common. Fibrinous exudates and vesicles were frequently observed via laryngoscopy. 54.5% of cases required airway support. **Conclusions:** Viral supraglottitis has a variable symptom duration and is characterized by nonspecific symptoms of the upper aerodigestive tract, but should be considered when other etiologies of supraglottitis are less likely. Prompt assessment of the airway

is crucial as many of these patients will require ventilator support. Pustular exudates and acuity at presentation can help differentiate HSV from other viral etiologies.

137. Meige's Syndrome and Respiratory Dystonia: A Clinical Overview and Case Series

William S. Tierney, MD, Cleveland, OH; Claudio F. Milstein, PhD, Cleveland, OH; Paul C. Bryson, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be familiar with Meige's syndrome, able to recognize this rare dystonia, and have guidelines for initial management of this condition based on cases presented from our practice.

Objectives: Meige syndrome is characterized by blepharospasm and dystonia of the oromandibular and/or laryngeal musculature. Spasms begin with blepharospasm and gradually progress to include other muscle groups. Laryngeal involvement is uncommon but presents a unique challenge to the otolaryngologist. Advanced disease can include severe dyspnea and dysphagia. This report describes our experience treating two patients with Meige's syndrome with laryngeal dystonia. **Study Design:** Case series. **Methods:** Electronic medical record review. **Results:** Two patients with Meige's syndrome including laryngeal dystonia were identified. Subject 1 presented with inspiratory stridor and cervical spasms at 68 and has been followed for 4 years. Stroboscopy showed paradoxical laryngeal adductor spasms but botulinum toxin injections failed to improve his symptoms. Pterygoid injection for oromandibular dystonia offered some relief. Subject 2 presented at 59 with inspiratory stridor, blepharospasm, oromandibular, cervical, and laryngeal dystonia, and was followed for 4 years. Endoscopy demonstrated paradoxical laryngeal adductor spasms and she had meaningful subjective improvement laryngeal botulinum toxin injections. As her disease progressed, she developed problematic dysphagia and malnutrition. She eventually suffered an aspiration event at home leading to pneumonia, respiratory failure, and death. **Conclusions:** Meige's syndrome with respiratory dystonia is a difficult to treat condition which the otolaryngologist may encounter. Botulinum toxin is indicated as an initial therapy. Aggressive, multidisciplinary management guided by patient response is recommended as these patients are at risk for morbid dyspnea and dysphagia.

OTOLOGY/NEUROTOLOGY

138. Women in Otopathology: A Review of Women Who Have Contributed to the Study of the Human Temporal Bone

Daniel P. Ballard, MD, Brooklyn, NY; Sandra H. Ho, MD, Brooklyn, NY; Alisa T. Timashpolsky, MD, Brooklyn, NY; Sujana S. Chandrasekhar, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the women who have contributed to the study of the human temporal bone and be aware of their important scientific achievements.

Objectives: One of many hidden secrets in medicine is the invisibility of women who have contributed to our knowledge. The object of this presentation is to describe the women who have contributed to the study of temporal bone pathology and review their most important published works. **Study Design:** Historical review. **Methods:** Women who have advanced our knowledge of otopathology were selected based on their importance to the field, scientific publications, and impact on modern otologic medicine. Both physicians and lab technicians were included in the review. Biographical information was collected from their publications, newspaper stories, historical articles published in scientific journals, as well as interviews with the subjects or their family members. The women and their colleagues were asked to select their most meaningful works for inclusion in the article. **Results:** Twelve women, including five physician scientists and seven temporal bone pathologists or technicians were selected for the review. A number of women were critical to the early work on temporal bone anatomy and histology. **Conclusions:** Modern understanding of temporal bone anatomy and pathology has benefitted from the tireless work of a number of important women, including otolaryngologists, temporal bone pathologists, and laboratory technicians. Increasing awareness and appreciation for their role in expanding our shared knowledge is essential for inspiring the next generation of otopathologists.

139. Quality Improvement Initiative to Increase Access to Audiometry in the Emergency Department Setting

Eric R. Barbarite, MD, Boston, MA; Rebecca M. Lewis, AuD PhD, Boston, MA; Renata M. Knoll, MD, Boston, MA; Aaron K. Remenschneider, MD MPH, Boston, MA; Kevin Franck, PhD MBA, Boston, MA; Elliott D. Kozin, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the evolving role of mobile audiometry and its utility in evaluating hearing loss in settings where audiometric resources are limited.

Objectives: Efficient and accurate evaluation of hearing loss in the emergency department (ED) setting is often difficult due to a lack of audiometric equipment and resources. Delays in the diagnosis and management of hearing loss, such as sudden sensorineural hearing loss, may result in poor hearing outcomes. The objective of this study is to implement an iPad based Federal Food and Drug Administration approved audiometry app in the ED setting to improve access to

audiometric evaluation. **Study Design:** Quality improvement study. **Methods:** Institute for Healthcare Improvement (IHI) Field Guide's 7 step methodology was used to implement system wide change at a tertiary care ED. **Results:** A team was formed and a focus group was used to identify opportunities for improvement. With a physician and audiologist champion, an IHI based action plan was used to develop a hearing loss algorithm containing essential information about timing and need for mobile audiometric testing. Physicians and nurses received in-service training for its application as a new standard protocol. Implementation of the plan included a pilot study of mobile audiometric testing using the SHOEBOX Audiometry app with circumaural DD65 headphones. Individual air conduction thresholds and pure tone averages from the ED were compared to gold standard measurements taken by an audiologist using a sound booth audiometer. **Conclusions:** We identified opportunities to improve access to high quality audiometry in the ED setting. Our methodological approach may have implications for addressing hearing loss in resource poor areas and during off hours.

140. Transcanal Computed Tomography View for Lateral Skull Base Endoscopic Ear Surgery

Samuel R. Barber, MD, Tucson, AZ; Judith Kempfle, MD, Boston, MA; Danielle Trakimas, BS, Boston, MA; Aaron K. Remenschneider, MD MPH, Boston, MA; Daniel J. Lee, MD, Boston, MA; Elliott D. Kozin, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants will learn about transcanal endoscopic ear surgery, and understand why a novel reformatted CT imaging series in the plane of the external auditory canal could assist with surgical planning.

Objectives: Middle ear and lateral skull base surgery increasingly employ endoscopes as an adjunct or replacement for the operative microscope. Traditional imaging evaluation involves computed tomography (CT) acquisition in the axial and coronal planes that are not optimized for the transcanal surgical corridor. We propose a novel CT based transcanal view for skull base surgical planning and real time navigation. **Study Design:** Cadaveric imaging study. **Methods:** Cadaveric temporal bones (n=6) underwent high resolution CT imaging (0.625mm slice thickness). Using 3D slicer 4.8, reformatted transcanal views in the plane of the external auditory canal (EAC) were created. Oblique sagittal, axial, and coronal reformats were used to measure EAC dimensions and distances between anatomic structures in the plane of the EAC. **Results:** The degree of oblique tilt for transcanal CT reformats was 6.67±1.78° to align the EAC in axial and coronal planes. Anticipated critical landmarks were identified easily using the transcanal view. Mean values were 8.68±0.38mm for annulus diameter, 9.5±0.93mm for isthmus diameter, 10.27±0.73mm for distance between annulus and isthmus, 2.95±0.13mm for distance between annulus and stapes capitulum, 5.12±0.35mm for distance between annulus and mastoid facial nerve, and 19.54±1.22mm for EAC length. **Conclusions:** This study is the first to illustrate a novel CT format intended for transcanal endoscopic skull base surgical planning and intraoperative navigation. Future studies may address how incorporation of a transcanal CT reformat may influence surgical decision making.

141. The Anteriorly Based Tympanomeatal Flap for Management of Anterior Tympanic Membrane Perforations

Joshua T. Blotter, BS, Salt Lake City, UT; Geoffrey C. Casazza, MD, Salt Lake City, UT; Hilary C. McCrary, MD, Salt Lake City, UT; Albert H. Park, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants will be informed of the anteriorly based tympanomeatal flap for the management of anterior tympanic membrane perforations.

Objectives: Compare outcomes of a standard microscopic assisted tympanoplasty to a novel endoscopic technique with creation of an anteriorly based tympanomeatal flap. **Study Design:** Retrospective case control. **Methods:** Results of microscopic and endoscopic tympanoplasty for management of anterior tympanic membrane perforations from a single surgeon were collected. Microscopic tympanoplasties were performed using either standard posterior inferior vascular strip incisions or lateral graft technique, whereas all endoscopic tympanoplasties were performed using an anteriorly based tympanomeatal flap. Results were compared using a Mann-Whitney U test and Chi-square analysis. **Results:** There were 28 patients in the microscopic group and 11 in the endoscopic group. The mean age was 6.53 in the microscopic and 11.21 in the endoscopic groups ($p<0.001$). There was no statistically significant difference in perforation etiology ($p=0.98$), perforation location ($p=0.63$), or perforation size ($p= 0.86$) between the two groups. Mean operating room time was 112.9 minutes and 118.5 minutes in the microscopic and endoscopic groups respectively ($p=0.73$). The perforation was successfully closed in 11 patients in the endoscopic group (100%) and 24 in the microscopic group (85.7%), $p=0.31$. Postoperative improvement in air conduction four frequency pure tone averages was noted in both the microscopic (31.4dB to 22.6dB; $p=0.007$) and the endoscopic (31.9dB to 21.2dB; $p=0.021$). There were no complications in either group. Mean followup was 160 days and 511 days in the endoscopic and microscopic groups respectively. **Conclusions:** The anteriorly based tympanomeatal flap is a novel technique for management of anterior tympanic membrane perforations. This technique is a viable alternative to a standard approach.

142. Recurrent and Progressive Facial Baroparesis on Flying Relieved by Eustachian Tube Dilation

Tracy Z. Cheng, MHS, Durham, NC; David M, Kaylie, MD MS, Durham, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to distinguish facial baroparesis from other causes of facial paralysis and know how to treat recurrent cases.

Objectives: Facial baroparesis is a rare phenomenon of seventh cranial nerve palsy traditionally reported in divers, with only 11 cases reported in aviation so far. It is important to correctly diagnose facial baroparesis given the differential of stroke and decompression disease and offer appropriate treatment for recurrent cases. **Study Design:** Case report. **Methods:** We present a patient with recurrent and progressive facial baroparesis treated with eustachian tube balloon dilation. Institutional medical records were reviewed and analysis of the current literature was performed. **Results:** We report a case of a 37 year old female who experienced recurrent and progressive left facial paralysis on descent from altitude on commercial airline flights with resolution between flights. The patient flew frequently for work related trips, and for the past 7 years noted facial paralysis on descent which began with mild asymmetry of the face and progressed to an inability to close her left eye. She denied any otologic complaints other than ear fullness and pressure causing left otalgia. The right side was not involved. After treatment with eustachian tube dilation, the patient has been on numerous flights with complete resolution of symptoms. **Conclusions:** This study presents a rare case of facial baroparesis on commercial flight descent which resolved after left eustachian tube dilation. While unilateral facial palsy can be concerning for stroke, a history of ear fullness and pressure may suggest facial baroparesis instead. For recurrent and progressive cases, eustachian tube dilation should be considered for treatment.

143. Meniere's Disease Clinical Subgroups in a US Cohort

Jason R. Crossley, BA, Washington, DC; Adnan S. Hussaini, MD, Washington, DC; Hung J. Kim, MD, Washington, DC; Michael Hoa, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the distribution of Meniere's disease phenotypes observed in a US cohort, and explain the utility of a clinical phenotypes for research and treatment of Meniere's disease in US patients.

Objectives: To ascertain the distribution of Meniere's disease (MD) phenotype subgroups in US based cohort, based on recently introduced classification scheme utilizing a Spanish and Portuguese cohort. **Study Design:** Retrospective, cross-sectional, single institutional chart review. **Methods:** The electronic medical record of patients with Meniere's disease (MD) was identified by ICD codes between 1/2013 and 3/2018 at a tertiary referral center and reviewed to extract subgroup defining features. Patients with definite MD per AAO-HNS criteria were categorized into one of five subgroups each for unilateral or bilateral MD (UMD or BMD). **Results:** Eighty-one patients with definite MD were identified. 85.2% cases were sporadic and 14.8% were familial. 72 cases of UMD were observed: 55.5% type 1, 20.8% type 2, 5.6% type 3, 18.1% type 4, and 4.2% type 5. This cohort was significantly different in distribution in comparison to the distribution reported in a Mediterranean cohort ($p < 0.01$) in type 2 with delayed hydrops and type 3 with familial cases. 9 cases of BMD were observed. 5 type 1 (55.5%), 3 type 3 (33.3%), and 1 type 5 (11.1%) were identified. No cases of type 2 or type 4 were identified. **Conclusions:** Meniere's disease phenotypic subgroup distribution in this US based population resembled the distribution observed in Spain and Portugal for BMD but not UMD. This finding may reflect the higher degree of homogeneity in the Mediterranean population. A larger US population study is warranted to validate the phenotypic subtyping of MD that may clarify pathogenesis of MD and guide its proper treatments.

144. The Role of Body Mass Index on Hearing Outcomes after Stapes Surgery

Shekhar K. Gadkaree, MD, Boston, MA; Rachel E. Weitzman, MS, Boston, MA; Ashley L. Miller, MD, Boston, MA; Yin Ren, MD PhD, Boston, MA; Michael J. McKenna, MD, Boston, MA; Eduardo C. Corrales, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how outcomes of stapedectomy and stapedotomy are affected by body mass index.

Objectives: Increased BMI (body mass index) has been associated with postoperative complications in multiple surgical specialties including otolaryngology. Particularly in otologic surgery, where positioning and dexterity are required for prosthesis placement, patients with higher BMI can be more challenging to position. The purpose of this study is to evaluate the impact of BMI on outcomes of stapes surgery. **Study Design:** Retrospective cohort study. **Methods:** Medical records were examined from January 2015 to December 2017 and patients undergoing stapedectomy or stapedotomy at two tertiary care facilities. A retrospective cohort analysis comparing hearing outcomes on postoperative audiogram following procedural intervention and BMI category was performed. The primary outcome was postoperative air bone gap (dB) on audiogram. **Results:** 263 stapedotomy and stapedectomy patients were included in the study population. Six percent of the population had BMI <18.5 (underweight), 30% had BMI between 18.6-24.9 (normal weight), 38% had BMI between 25-29.9 (overweight), 13% had BMI between 30-35 (obese class 1), and 7% had BMI between 35-40 (obese class 2), 4% had a BMI greater than 40 (obese class 3, severe). The mean preoperative and postoperative air bone gap was 27.0 dB

(SD 15) and 10.4 (SD 10.6) dB, respectively, with a gap ≤ 20 dB in 87% of cases. There were no significant differences in the postoperative ABG results when comparing the BMI categories (p=0.11). **Conclusions:** Stapedectomy is an effective procedure that can be performed by experienced surgeons with positive hearing outcomes. While high BMI patients may be a challenge to position appropriately for their surgery, this does not translate to altered otologic outcomes for these patients.

145. WITHDRAWN - Subjective Stapedotomy Failure despite Air Bone Gap Closure

Michael P. Gebhard, BS, Gainesville, FL; Varun V. Varadarajan, MD, Gainesville, FL; Doug M. Bennion, MD PhD, Iowa City, IA; Patrick J. Antonelli, MD, Gainesville, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to define objective and subjective stapedotomy failure and review potential etiologies and treatment options for subjective stapedotomy failure.

Objectives: Stapedotomy success may be measured by objective, audiometric results or subjective complaints. Subjective stapedotomy failure remains a poorly described outcome. We examined the clinical and radiographic findings of stapedotomy patients who were considered subjective failures despite air bone gap (ABG) closure <10 dB. **Study Design:** Case series. **Methods:** Setting: Tertiary referral center. Patients: The medical records of patients who were considered surgical failures after undergoing stapedotomy between 1993 and 2018 were reviewed. Patients with persistent hearing complaints despite ABG closure <10 dB were considered subjective failures and were included in this series. **Results:** 6 patients were considered subjective failures. Reasons included subjective hearing loss (5), tinnitus (2), and episodic aural fullness and hearing loss (1). No cases of loose wire syndrome were encountered. CT obtained in 3 suggested prosthesis displacement (2) and ossification of the round window (1). 4 of 6 underwent revision surgery, of which 3 were unsuccessful due to persistent subjective hearing loss (2), tinnitus (2), vertigo (1), and aural fullness (1). The sole successful revision surgery had prosthesis displacement demonstrated on CT. **Conclusions:** Patient dissatisfaction despite ABG closure after stapedotomy is uncommon but may be correctable with revision surgery in selected cases. CT may identify pathology amenable to surgical repair.

146. Characteristics and Progression of Hearing Loss in Children with Turner's Syndrome

Alexandra O. Hamberis, BS, Charleston, SC; Charmee M. Mehta, BSPH, Charleston, SC; James R. Dornhoffer, MD, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the characteristics affecting severity of hearing loss in Turner's syndrome as well as the characteristics affecting long term otologic outcomes.

Objectives: Evaluate patterns of hearing impairment in female children with Turner's syndrome and determine factors that influence the severity of hearing loss and long term otologic outcomes. **Study Design:** Retrospective review. **Methods:** Demographic, otologic, radiologic, and medical data for children with Turner's syndrome was extracted from the Audiological and Genetic Database to analyze for patterns of hearing loss as well as effects of comorbidities, anatomic or demographic variations, and interventions on long term hearing outcomes. **Results:** 272 patients with Turner's syndrome were identified, with 206 having reported audiological data. Of these children, 160 had hearing loss, 85% of which was bilateral (275 total impaired ears). Of the ears with hearing loss and quantifiable severity, 14.5% (N=40) had moderate or worse hearing loss. Mixed hearing and conductive hearing loss predominated, followed by sensorineural hearing loss. Further analysis of factors that influence severity and progression will be discussed. These include anomalies such as congenital defects, seizures, presence of cholesteatoma, placement of ear tubes, rate of ear infection, and other relevant conditions. The incidence and impact of ear surgery on hearing progression will also be discussed. **Conclusions:** It is evident that children with Turner's syndrome have hearing loss at rates exceeding the normal population. The specific characteristics that put patients at a higher risk of progression and increased severity of hearing loss are significant. Determination of these factors and interventions that modify their effect provides great value in personalizing care of a population at risk for poor otologic outcomes.

147. Trans-Graft T tube Tympanoplasty for Tympanic Membrane Perforation in the Setting of Granulomatosis with Polyangiitis

Andrea L. Hanick, MD, Cleveland, OH; Thomas J. Haberkamp, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss the well documented otorhinolaryngological manifestations that are crucial to diagnosis and successful management of disease in patients with granulomatosis with polyangiitis (GPA); and 2) explain how GPA patients with tympanic membrane perforation requiring tympanoplasty may benefit from stabilization of long term tympanostomy tube at the time of repair, which can be successfully placed through the tragal cartilage graft.

Objectives: To describe a technique for cartilage tympanoplasty incorporating a trans-graft tympanostomy tube and to discuss the utility of such a reconstruction in the setting of predictable recurrence of middle ear effusion and eustachian

tube dysfunction due to systemic disease in patients with granulomatosis with polyangiitis (GPA). **Study Design:** Case report and description of surgical technique. **Methods:** A 20 year old female patient presented to otology outpatient clinic with a history of granulomatosis with polyangiitis initially diagnosed at age 9 and a long history of eustachian tube dysfunction, recurrent otitis media with effusion, multiple sets of tympanostomy tubes, and resultant left tympanic membrane perforation. She was felt to be in medical remission from her GPA at the time of evaluation and, due to ongoing conductive hearing loss, she was recommended to undergo tympanoplasty. **Results:** A surgical technique for cartilage tympanoplasty with tragal cartilage graft and trans-graft T tube was performed without complications and is discussed in detail. **Conclusions:** Granulomatosis with polyangiitis manifests in a myriad of symptoms of the head and neck, including significant otologic disease burden. In GPA patients, tympanoplasty should often incorporate a long term tympanostomy tube to prevent symptom recurrence and preserve repair; this can be successfully accomplished using a trans-graft T tube at the time of cartilage tympanoplasty.

148. Pure Word Deafness after Unilateral MCA Stroke: A Case Report

Erin A. Harvey, BS, Cincinnati, OH; Andrew J. Redmann, MD, Cincinnati, OH; Rebecca Cornelius, MD, Cincinnati, OH; Myles L. Pensak, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the presentation of word deafness after stroke.

Objectives: 1) Describe a unique case of auditory verbal agnosia after a unilateral cerebrovascular incident; and 2) discuss differences in presentation in cortical deafness. **Study Design:** Auditory verbal agnosia (word deafness) is a unique symptomatology involving loss of word recognition while leaving all other forms of language intact. Most patients present with bilateral temporal lobe lesions in the auditory cortex, but here we present a unique unilateral presentation. **Methods:** Case review of pure auditory verbal agnosia after unilateral MCA stroke. **Results:** A 69 year old right handed African American male with history of tobacco abuse, hypertension and hyperlipidemia presented to neurotology clinic with a 6 year history of deafness since a left MCA stroke in 2011. At presentation, he lived independently, but interacted with his daughter on a daily basis. The patient could not understand his daughter or the TV, no matter how loud the volume, and requested hearing aids or cochlear implantation for rehabilitation. Due to illiteracy he could not communicate via writing. He also had difficulty localizing distant sounds. Audiogram at presentation showed symmetric mild to severe sensorineural hearing loss with 0% word recognition bilaterally. MRI showed a left sided MCA infarct with lesions of superior temporal gyrus and temporoparietal areas, with normal right sided hemisphere. **Conclusions:** Pure word deafness is most commonly reported after bilateral insult to the auditory cortex, but symptoms after unilateral injury may not be as rare as once thought. An audiologic workup should be considered in all temporal lobe injuries to allow for appropriate auditory rehabilitation and predict potential recovery.

149. Development of a Robotic Assisted Cochlear Implant Insertion System

Allan M. Henslee, PhD, Iowa City, IA; Christopher R. Kaufmann, MD, Iowa City, IA; Marlan R. Hansen, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the insertion force profiles between robotically assisted and manual (by hand) cochlear implant electrode insertions.

Objectives: Variability in hearing preservation cochlear implant (CI) outcomes exists across patients, implant centers, surgeons, and electrode types. While surgical techniques aimed at reducing electrode insertion trauma are well established, electrode insertion trauma remains one contributing factor to the significant variability seen in hearing preservation outcomes. This company is developing a robotic assisted insertion device to improve CI electrode insertion consistently and with precision. The objective of this study was to characterize the performance of the insertion system in a benchtop setting. **Study Design:** CI electrode insertions were performed using both synthetic (3D printed) and cadaveric cochleae and utilized electrodes from 4 different CI manufacturers. Device insertions were compared to manual (by hand) insertions at 3 insertion velocities: 0.1, 0.5, and 1 mm/sec. **Methods:** Both synthetic and cadaveric cochleae were mounted on a single axis force transducer orthogonal to the round window. Forces were recorded during electrode insertions and both maximum force (mN) and force variation (mN/sec) metrics were calculated for individual insertion runs and averaged across test samples (n=3). **Results:** Force variation of insertions performed using the device showed a statistically significant reduction vs. manual insertion (88.2±4.1% average reduction) for all insertion velocities and electrodes tested in both synthetic and cadaveric cochlea. Reductions in maximum force followed a similar trend. **Conclusions:** Our device improves electrode insertion force consistency across multiple electrode types. Use of a robotic device to assist surgeons when inserting electrodes may lead to less traumatic CI surgeries and more consistent outcomes for patients undergoing hearing preservation CI surgery.

150. John J. Conley, MD Resident Research Award - Eastern Section
Case Series with Chart Review of a Novel Chronic Ear Grading System
Sandra H. Ho, MD, Brooklyn, NY; Daniel P. Ballard, MD, Brooklyn, NY; Lori A. Hoepner, DrPH MPH, Brooklyn, NY; Matthew M. Hanson, MD, Brooklyn, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to grade a chronic ear using the COACH score and see from the results of the study the potential use of a standardized chronic ear grading system.

Objectives: Currently, there is no standard way of grading a chronic ear, especially one with cholesteatoma. Some objective classification systems, such as the Bellucci and Austin-Kartush classifications exist, but only measure certain aspects of ear function or status and do not give a complete picture of the pathological and functional aspects of the ear. The COACH score, developed by the principal investigator of this study, attempts to provide otolaryngologists with a status of the chronic ear. It is a 10 point scale with 5 criteria, cochlea (hearing), otorrhea, aeration, cholesteatoma, happiness ranked from 0-2. We sought to determine if there is a change in COACH scores in patients that undergo surgery for cholesteatoma and if there is any correlation between the preoperative COACH score and the Middle Ear Risk Index (MERI). **Study Design:** Case series with chart review. **Methods:** Case series with chart review from 2013-2017. Patients with diagnosis of cholesteatoma undergoing surgery were included in the study. Preoperative and postoperative COACH scores were recorded and change scores calculated. **Results:** Thirty-five patients were included in the study. Mean age was 37 years (range 6-79), with 18 males and 17 females. The mean preoperative COACH score was 2.7 (range 0-8, SD 2.5). The mean postoperative COACH score was 8.1 (range 4-10, SD 1.2). There was a statistically significant difference between the preoperative and postoperative COACH scores ($p<0.0001$, 95% CI 1.68-2.69). There was however, no significant difference between the preoperative and postoperative air bone gaps ($p>0.68$, 95% CI -4.01-6.1) or any correlation between the postoperative COACH score and MERI. **Conclusions:** The COACH score is a novel chronic ear grading system developed by the principal investigator that can become a standardized way of grading a chronic ear. We have demonstrated that patients who have had surgery for cholesteatoma have higher postoperative COACH scores. A prospective study is underway to determine the face validity and reliability of the score.

151. Seasonal Patterns of Benign Paroxysmal Positional Vertigo: An Institutional Experience
Neal M. Jackson, MD, New Orleans, LA; Alexander Leo Luryi, MD, New Haven, CT; Dennis I. Bojrab, MD, Farmington Hills, MI; Michael J. Larouere, MD, Farmington Hills, MI; Seilesh Babu, MD, Farmington Hills, MI; Christopher A. Schutt, MD, Farmington Hills, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to: 1) explain the seasonal patterns of BPPV incidence; 2) understand seasonal variations in the number of days until recurrence of BPPV; 3) discuss relevant literature; and 4) explain possible explanations for seasonal variation of BPPV (e.g., low serum vitamin D levels, etc.).

Objectives: Objectives: 1) review all cases of benign paroxysmal positional vertigo (BPPV) at a tertiary neurotology institution, noting the season of the year in which the initial visit occurred; 2) compare relative seasonal incidence of BPPV; and 3) compare number of days to recurrence of BPPV from season to season. **Study Design:** Retrospective chart review. **Methods:** A retrospective chart review was conducted at a single high volume neurotology practice of patients diagnosed with BPPV with positive Dix-Hallpike maneuver from 2003 to 2017. Particular attention paid to season of initial presentation (winter, spring, summer, autumn) as well as number of days to recurrence of BPPV. Demographic information was also noted. **Results:** 1973 evaluable patient records were reviewed. The average age was 64.2 years [range 21.7-98.2 years] and there was a female predominance (71.9%) vs. male (28.1%). The highest seasonal incidence of BPPV was in spring with 564 visits (28.5%), followed by winter with 505 (25.6%), summer with 457 (23.1%) and autumn with 447 (22.7%). While this was not statistically significant, there is a trend towards higher rates in spring and winter. The number of days to recurrence was shortest after initial BPPV in spring (119), then winter (134), summer (136), and autumn (173). **Conclusions:** No statistically significant seasonal variation in BPPV was demonstrated in this study, which is the largest known review of such data. However, there appears to be an interesting trend towards seasonal variation in BPPV, with spring having the highest incidence of BPPV and the fewest number of days to recurrence of BPPV. Further research is indicated to investigate physiologic or behavioral explanations for seasonal variation.

152. Characteristics and Outcomes of Pediatric Vestibular Schwannomas
Tyler A. Janz, BS, Charleston, SC; P. Ryan Camilon, MD, Boston, MA; Shaun A. Nguyen, MD, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC; Theodore R. McRackan, MD, Charleston, SC; Paul R. Lambert, MD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the common demographics of pediatric patients with vestibular schwannomas. Participants should be able to understand the treatment paradigms that exist based on vestibular schwannoma tumor size. Participants should also be able to understand the survival outcomes for pediatric vestibular schwannoma patients.

Objectives: To review the demographics, treatment modalities, and survival of children with vestibular schwannomas. **Study Design:** National population based retrospective study using the Surveillance, Epidemiology, and End Results (SEER) database. **Methods:** Pediatric patients from ages 0 to 18 years in the SEER database were included from 2004-2014 based on a diagnosis of vestibular schwannoma using the primary site ICD O-3 code of C72.4: acoustic nerve primary site and the ICD O-3 histology codes of 9540/1: neurofibromatosis, NOS; 9560/0: neurilemoma, NOS; or 9570/0: neuroma, NOS. **Results:** One hundred forty-eight pediatric vestibular schwannomas (VSs) cases were identified. The mean age at diagnosis was 13.9 years (range 4.0-18.0). Eighty-five (57.4%) patients were female. Seventy-seven (52.0%) patients had isolated unilateral VSs while 71 (48.0%) patients had either bilateral VSs or unilateral VSs with other brain or cranial nerve tumors. Seventy-five (50.7%) patients received surgical resection only, 52 (35.1%) received no treatment, 11 (7.4%) received radiation only, and 7 (4.7%) received surgery and radiation. The median tumor size for patients who received no treatment was 9.5 mm (interquartile range [IQR]: 8.0) compared to 33.5 mm (IQR: 23.0) for patients who received surgical care and 41.0 mm (IQR: 1.5) for patients who received both surgery and radiation ($p<.001$). The 5 year overall survival rate was 97%. **Conclusions:** Pediatric vestibular schwannomas tend to be diagnosed in adolescence. No male or female preference was appreciated. Treatment varied according to tumor size. Survival rates for children with vestibular schwannomas are excellent. These data may assist healthcare providers when counseling children with vestibular schwannomas and their families.

153. Cranial Suture Diastasis in Pediatric Temporal Bone Trauma

Jacob B. Kahane, MD, Las Vegas, NV; Nathaniel Reeve, MD, Las Vegas, NV; Jordan A. Miller, BS, Las Vegas, NV; Matthew Ng, MD, Las Vegas, NV

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss traumatic temporal bone suture diastases and its clinical associations in the pediatric population.

Objectives: Cranial suture diastasis is a rare result of traumatic injury. To date, only a handful of case reports exist; none of which report temporal bone involvement. As a result, the clinical characteristic of temporal bone suture diastasis has not been described. Our goal is to describe temporal bone diastasis and identify clinical sequelae. **Study Design:** Retrospective chart review. **Methods:** A retrospective chart review of 19 pediatric patients, ages 16 and younger, who suffered a temporal bone fracture was conducted. Temporal bone CT scans were analyzed to identify if suture diastasis had occurred along the occipitomastoid, lambdoid, or squamous sutures. Fractures were also classified as longitudinal, transverse, or mixed. Statistical analysis of age, sex, fracture type, otic capsule status, facial nerve involvement, laterality, and mechanism of injury was conducted between the diastasis and non-diastasis groups. **Results:** Diastasis occurred in 31.58% of all pediatric temporal bone fractures. Transverse and complex fracture types were significantly associated with diastasis; comprising 83.33% of diastasis fractures compared to longitudinal at 16.66% ($p=.0352$). The average age of diastasis was 8.68 years and the non-diastasis group was 11.38. Further analysis of MOI, otic capsule status, facial nerve involvement, and laterality showed no statistically significant difference between the diastasis and non-diastasis groups. **Conclusions:** Temporal bone suture diastasis was more common than expected, and is statically associated with transverse and complex fracture patterns. While the age difference between the diastasis and non-diastasis groups is not statically significant ($p=0.1649$), we still believe it suggests a risk of diastasis prior to the age of suture ossification.

154. Understanding the Etiology, Pathogeneses, and Treatment of Objective Tinnitus: A Unique Case Series Presentation

David A. Kasle, MD, New Haven, CT; Parsa P. Salehi, MD, New Haven, CT; Sina J. Torabi, BA, New Haven, CT; Douglas M. Hildrew, MD, New Haven, CT

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the etiopathogenesis of myoclonus induced objective tinnitus. Additionally they will explore the effect palatal and middle ear myoclonus has on objective tinnitus, via unique case presentations, and their treatment ramifications.

Objectives: The etiology and optimal treatment of objective tinnitus (OT) remains unclear, though both palatal myoclonus (PM) and middle ear myoclonus (MEM) are considered to be major factors in this pathology. Our goal is to present two unique cases of OT and our attempted treatment based on proposed disease etiology and accepted treatment algorithms. Additionally, we aim to review the existing literature to explore common questions regarding myoclonus induced OT. **Study Design:** Literature review and case series. **Methods:** A review of the English language literature on PubMed was done to assess cases of objective tinnitus and explore its etiology and pathogenesis. **Results:** In this report we discuss two unique cases of objective tinnitus secondary to palatal and/or middle ear myoclonus. In the first case, tinnitus coincided with closing of the eustachian tube, as seen on nasal endoscopy. The second case discusses palatal myoclonus elicited with palpation of varying groups of skeletal muscles located remotely from the ear. Both cases of myoclonus coincided with objective tinnitus. Treatment with an incision of the tensor tympani muscle was only mildly helpful. **Conclusions:** Middle ear myoclonus and palatal myoclonus each likely play a role in the etiopathogenesis of objective tinnitus. Even when one seems to be a major contributor diagnostically, recognizing that another cause of OT may be contributing is integral prior to surgical intervention.

155. Acute Sensorineural Hearing Loss Due to Erythrocytosis with Hyperviscosity Syndrome - Case Report and a Review of the Literature

Naushad M. Khakoo, MD, Syracuse, NY; Charles I. Woods, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss a rare etiology of sudden hearing loss including the diagnostic workup and relevant medical management.

Objectives: To discuss a rare etiology of sudden hearing loss including the diagnostic workup and relevant medical management. **Study Design:** Case report and literature review. **Methods:** Review of the medical records of a 36 year old male with history of obstructive sleep apnea with noncompliance to therapy and prior left sided hearing loss, who presented with acute onset right (contralateral) hearing loss, bilateral tinnitus, intermittent vertigo; he also stated worsening vision over the prior year. **Results:** Physical examination showed severe conjunctival injection along with bilateral middle ear effusions and profound mixed hearing loss on audiometry. Hematology revealed an elevated hematocrit and after further workup he was diagnosed with profound erythrocytosis with hyperviscosity syndrome. CPAP, aspirin and phlebotomy were started with subjective improvement in vision and a 15-20dB improvement in hearing in the right ear on repeat testing. **Conclusions:** Sensorineural hearing loss secondary to erythrocytosis is a rare occurrence, with only case reports described in the literature. Diagnosis requires exclusion of possible neoplastic and endocrine etiologies, and workup for cardiovascular and neurologic sequelae. Awareness of the higher incidence of hearing loss in patients with obstructive sleep apnea along with prevalence of erythrocytosis in this population may be important in further workup and eventual treatment.

156. Histopathology of the Peripheral Vestibular System Following Temporal Bone Fracture

Renata M. Knoll, MD, Boston, MA; Reuven Ishai, MD, Boston, MA; Danielle R. Trakimas, MSE, Boston, MA; David H. Jung, MD PHD, Boston, MA; Aaron K. Remenschneider, MD MPH, Boston, MA; Elliott D. Kozin, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effects of TBF on the peripheral vestibular system.

Objectives: Balance disorders are a common sequela of temporal bone fractures (TBF). The mechanism of injury to the vestibular peripheral system following TBF is not well described. We aim to investigate the histopathology of the peripheral vestibular system in patients who sustained TBFs. **Study Design:** Otopathologic analysis. **Methods:** Specimens from the National Temporal Bone Pathology Registry with history of TBF were included. Specimens were evaluated by light microscopy for number of Scarpa ganglion cells (ScGC) in the superior and inferior vestibular nerves, vestibular HC and/or dendrites degeneration in vestibular end organs, presence of vestibular hydrops, and blockage of the endolymphatic duct. **Results:** Six temporal bones (TB) from 4 individuals were identified. All fractures involved the otic capsule. Severe degeneration of the vestibular membranous labyrinth was identified in semicircular canals in all fractured cases. The maculae utriculi and sacculi showed mild to severe degeneration in all fractured cases. Vestibular hydrops (n= 2TB) and blockage of the endolymphatic duct (n= 3TB) were identified. There was a decrease of 65% (59-82%) in the mean total ScGC count compared to historical age matched controls. In patients with unilateral TBF (n= 4TB), the side of the fracture showed on average 33% greater loss of ScGC than the side without fracture. Nonfractured sides (n= 2TB) had 39% and 59% of ScGC loss compared to controls. **Conclusions:** TBF is associated with distinct peripheral vestibular pathology, including reduction of ScGC. Notably, a reduction of ScGC was present on nonfractured side. Findings have implications for mechanism of peripheral vestibular pathology following head injury.

157. Multicenter Outcomes of Cochlear Implantation Following Head Trauma

Renata Malimpensa Knoll, MD, Boston, MA; Danielle R. Trakimas, MSE, Boston, MA; Joseph B. Nadol Jr., MD, Boston, MA; David H. Jung, MD PHD, Boston, MA; Aaron K. Remenschneider, MD MPH, Boston, MA; Elliott D. Kozin, MD, Boston, MA

Educational Objective: The study is among the largest series examining CI after head injury, and illustrates CI is an effective method for aural rehabilitation in patients with hearing loss after head injury. The presence of TB fracture does appear to limit postoperative CNC score.

Objectives: Head injury is a major worldwide cause of death and disability. The prevalence of hearing loss following head injury is estimated to range up to 67%. In cases of a severe to profound sensorineural hearing loss (SNHL) after head injury, CI is the primary option for auditory rehabilitation. However, few studies have described CI outcomes following head injury with and without temporal bone fracture. **Study Design:** Case series at two tertiary care hospitals. **Methods:** A retrospective analysis was performed in patients who underwent a CI following head injury. Primary outcomes included duration of deafness prior to CI and postoperative consonant nucleus constant whole word (CNC) scores. **Results:** Nineteen patients (84% male), corresponding to 24 CIs, were identified. The mean age at injury was 28 years (±16). Sixteen ears from 12 patients (63%) presented TBF, in which 15 of them received CI on the fractured side. Promontory testing occurred in 3 patients and all cases showed preserved auditory response. Mean age at implantation was 38 years (±14),

and duration of deafness was 8.9 years (±11.5 years). The mean duration of CI use was 4.9 years (± 6.2 yr). The mean postoperative CNC score was 68% (± 21%, n=20 with CNC testing). One patient did not have neural response following CI. **Conclusions:** The study is among the largest series examining CI after head injury, and illustrates CI is an effective method for aural rehabilitation in patients with hearing loss after head injury. The presence of TB fracture does appear to limit postoperative CNC score.

158. Examining the Relationship between Angular Insertion Depth and Hearing Outcomes in Patients Receiving Cochlear Implants

Timothy K. Koo, BA, Tampa, FL; Christopher J. Danner, MD, Tampa, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the correlation between angular insertion depth and speech recognition scores.

Objectives: To determine the relationship between angular insertion depth (AID) and hearing outcomes. **Study Design:** Retrospective review. **Methods:** Postlingually deafened adults who received cochlear implants between January 1, 2015 and January 1, 2016 were chosen. Intraoperative fluoroscopies were obtained to determine AID of both apical and basal electrodes. Preoperative AzBio scores and pure tone averages (PTA) testing the ipsilateral ear were obtained to determine the level of patient's hearing before implantation. Patients were split into groups by preoperative AzBio scores, preoperative PTA, and brand of cochlear implant. Postoperative AzBio scores testing the implanted ear in the CI only condition in quiet from 6 to 18 months after surgery were obtained and compared with AID to determine correlation. **Results:** 74 cochlear implants were included in this study representing 69 unique patients. Median apical AID for the whole cohort was 394° (IQ range 374°-472°), and median basal AID for the whole cohort was 18° (IQ range 14°-28°). Average postoperative AzBio score for the whole group was 50% ± 26.8. The correlation between apical AID and postoperative AzBio score for this group was not found to be significant ($r = 0.05$, $P = 0.33$). Basal AID similarly did not have a significant correlation with postoperative AzBio score ($r = 0.05$, $P = 0.32$). **Conclusions:** There was no observed linear relationship between AID and postoperative AzBio scores in our cohort for the range that was examined. At the AID ranges studied, there may be other factors that best predict the patient's hearing outcomes.

159. Clinical Significance of the Mysterious Internal Auditory Canal Diverticula

Elliott D. Kozin, MD, Boston, MA; Dawson Wells, Boston, MA; Jenny X. Chen, MD, Boston, MA; Katherine Reinshagen, MD, Boston, MA; Joseph B. Nadol, MD, Boston, MA; Alicia M. Quesnel, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe otopathologic findings of internal auditory canal diverticula.

Objectives: Internal auditory canal (IAC) diverticula, also known as IAC cavitary lesions and anterior cupping of the IAC, observed in otopathologic specimens and computed tomography (CT) scans of the temporal bone are thought to be related to otosclerosis. Herein, we aim to correlate the otopathologic and radiographic and findings of IAC diverticula to better understand the clinical significance of this phenomenon. **Study Design:** Otopathologic analysis of postmortem specimens. **Methods:** 105 specimens of alternating ears were identified from the National Temporal Bone Hearing and Balance Pathology Resource Registry. Inclusion criteria included the availability of histological slides and CT scans. Exclusion criteria included cases with severe postmortem changes or lesions causing bony destruction of the IAC. **Results:** Ninety-seven specimens met criteria for study. The average age of death was 77 years old (SD=18) and 42% were male patients. IAC diverticula were found in 48% of otopathology specimens and 46% of associated CT scans. Of the cases with evidence of IAC diverticula on otopathology, 68% also had evidence of IAC diverticula on CT. Conversely, of the cases with evidence of IAC diverticula on CT, 70% also had evidence of IAC diverticula on otopathology. Overall, 27% of specimens had otosclerosis, and in cases without IAC diverticula, the rate of otosclerosis was 14%. Among cases where IAC diverticula were present, the most common diagnosis was otosclerosis (39%). **Conclusions:** IAC diverticula are common in cases of otosclerosis, however, they may also be associated with other pathologies. Patients may warrant audiometric evaluation when these lesions are identified on CT.

160. Rat Model of External Auditory Canal Stenosis

Dustin M. Lang, MD, Gainesville, FL; Patrick J. Antonelli, MD, Gainesville, FL; Carolyn O. Dirain, PhD, Gainesville, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to use this novel rat model to perform experiments pertaining to the investigation of external auditory canal stenosis and discuss how the extent of external auditory canal injury correlates with the extent of resulting stenosis.

Objectives: To establish a rat model of acquired external auditory canal (EAC) stenosis and to correlate extent of injury with extent of stenosis. **Study Design:** Basic science animal research study. **Methods:** Sprague-Dawley rats received a 25, 50, or 75% circumferential EAC injury with electrocautery (n=4 rats or 8 ears per group). The primary outcome was measurement of the cross-sectional area of the EAC lumen at its narrowest portion 21 days after injury. The extent of

stenosis was quantified and the nature of the stenosis was assessed with microscopic histology. **Results:** A 25% circumferential injury led to 4-34% stenosis (mean 13%), 50% injury resulted in 43-100% stenosis (mean, 73%), and 75% injury resulted in 94-100% stenosis (mean=99%, p<0.0001). The 50% circumferential injury produced 5 of 8 ears with 30-75% stenosis, the other ears had >75% stenosis. Wounded ears showed evidence of intact cartilage and epithelium, with increased thickness of the subepithelial layer and localized fibrosis. **Conclusions:** Electrocautery injury in the ventral aspect of the rat cartilaginous EAC resulted in reproducible and clinically relevant EAC stenosis. This rat model will be useful in studying methods for preventing acquired EAC stenosis. The correlation of the injury extent (circumference) with resulting stenosis may inform clinical management of EAC injuries.

161. Hydroxyapatite Cement Cranioplasty for Translabyrinthine Acoustic Surgery: A Single Institution Experience

Alexander L. Luryi, MD, New Haven, CT; John F. Kveton, MD, New Haven, CT; Elias M. Michaelides, MD, New Haven, CT; Christopher A. Schutt, MD, Farmington Hills, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the risks and benefits associated with cranioplasty using hydroxyapatite cement alone following translabyrinthine surgery.

Objectives: To assess complication rates for hydroxyapatite cement (HAC) cranioplasty in translabyrinthine acoustic surgery and to compare HAC cranioplasty to historical controls. **Study Design:** Retrospective chart review. **Methods:** Records of patients undergoing de novo translabyrinthine surgery with HAC cranioplasty at a tertiary otology center between 2010 and 2017 were reviewed. Cases were individually examined and excluded if patients had less than 90 days' followup or if concurrent cranioplasty methods such as abdominal fat grafting were also used. **Results:** Fifty-two patients underwent HAC cranioplasty during the study period for 51 acoustic neuromas and 1 meningioma. Average length of followup was 30.5 months and ranged from 3 months to 7 years. HAC cranioplasty was associated with acceptable rates of CSF leak (3.8%), wound or intracranial infection (5.8%), need for unplanned revision surgery (9.6%), and total complications (15.3%). All complications occurred within 5 months of surgery. No delayed wound infections or implant extrusions occurred. **Conclusions:** HAC cranioplasty has an acceptable complication profile for translabyrinthine surgery and is a viable alternative to abdominal fat grafting without associated donor site morbidity.

162. Failure to Close the Gap: Concomitant Superior Canal Dehiscence in Otosclerosis Patients

Anne K. Maxwell, MD, Los Angeles, CA; William H. Slattery III, MD, Los Angeles, CA; Mia E. Miller, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify superior semicircular canal dehiscence as a rare but important cause of persistent conductive hearing loss following stapes surgery in patients with confirmed otosclerosis.

Objectives: Superior semicircular canal dehiscence (SSCD) causing conductive hearing loss with present reflexes is a known reason for stapes surgery failure. However, concomitant SSCD and otosclerosis occurs rarely. We present a case series of SSCD diagnosed in positively identified otosclerosis patients. **Study Design:** Clinical case series in a tertiary referral neurotologic practice. **Methods:** Clinical histories, operative findings, audiograms and computed tomography (CT) images were reviewed for patients diagnosed with SSCD following otosclerosis surgery. Patients with present stapedial reflexes were excluded. Comprehensive literature review was performed. **Results:** Two cases were identified. Both patients demonstrated improvement in bone conduction threshold. In one, there was no improvement in pure tone average (PTA). In the second, the patient noted subjective hearing improvement. On audiometry, there was partial closure of the ABG with 22 decibel (dB) improvement in PTA and persistent low frequency 25-45 dB ABG. Neither developed postoperative third window or vestibular symptoms; the only symptom was persistent hearing loss. CT demonstrated SSCD and otosclerosis with good positioning of the stapes prostheses. **Conclusions:** Failure to close the ABG in patients with positively identified otosclerosis intraoperatively may be due to SSCD as an occult concomitant diagnosis. SSCD should be considered as a possible cause of persistent conductive hearing loss after stapes surgery.

163. Isolated Saccular Hydrops on High Resolution Magnetic Resonance Imaging (MRI) and its Association with Full Spectrum Meniere's Disease

Anne K. Maxwell, MD, Los Angeles, CA; Thomas Muelleman, MD, Los Angeles, CA; Akira Ishiyama, MD, Los Angeles, CA; Stellios Karnezis, MD, Los Angeles, CA; Gail Ishiyama, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the relation between saccular hydrops seen on high resolution MRI and understand that these patients display the full clinical spectrum of Meniere's disease. They should understand the correlation between these MRI findings with audiometry and vestibular testing.

Objectives: To describe the clinical presentation of patients with isolated saccular endolymphatic hydrops (EH), reviewing clinical histories, neurotological evaluation, audiometry and vestibular testing. **Study Design:** Clinical case series.

Methods: The clinical history and audiovestibular testing results of subjects who present with isolated saccular EH on high resolution delayed IV contrast MRI between November 2015 and November 2016 at a university tertiary referral neurotology clinic. Patients with bilateral disease or unspecified laterality were excluded. The MRI was performed on a 3 tesla unit using cisternographic heavily T2 weighted 3-D turbo spin echo sequence (sampling perfection with application optimized contrasts by using different flip angle evolutions: T2 SPACE), and a heavily T2 weighted 3-D FLAIR sequence. **Results:** Isolated saccular EH was seen in 18 subjects. All 18 met definite Meniere's disease criteria. Audiometry documented hearing loss in all. Four patients had sudden hearing loss followed by Meniere's attacks of vertigo and aural fullness, the remainder demonstrated mild to severe low frequency fluctuating loss. Thirteen of 17 patients tested had caloric paresis ranging from 22% to 67%. Vestibular evoked myogenic potential (VEMP) testing of 16 patients showed absent responses in 25% and reduced responses in 25%. Two patients later developed cochlear saccular hydrops. **Conclusions:** The full spectrum of Meniere's disease (fluctuating hearing loss, tinnitus, and vertigo) can be associated with isolated saccular EH. The majority of the patients have a caloric paresis, and half have a decrement in the VEMP on the ipsilateral side. We propose that Meniere's disease often begins in the saccule in the early stages.

164. Characteristics and Progression of Hearing Loss in Children with Either Patau Syndrome or Edward's Syndrome

Alexandra O. Hamberis, BS, Charleston, SC; Charmee H. Mehta, BSPH, Charleston, SC; James R. Dornhoffer, MD, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the characteristics affecting severity of hearing loss in either trisomy as well as the characteristics affecting long term otologic outcomes.

Objectives: Evaluate patterns of hearing impairment in children with either Edward's syndrome or Patau syndrome and determine factors that influence the severity of hearing loss and long term otologic outcomes. **Study Design:** Retrospective review. **Methods:** Demographic, otologic, and medical data for children with either trisomy was extracted from the Audiological and Genetic Database to analyze patterns of hearing loss as well as effects of comorbidities, anatomic or demographic variations, and interventions on long term hearing outcomes. **Results:** 130 patients with either trisomy were identified of which 76 had reported audiological data. Of these children, 66 had hearing loss. 40% of children with Edward's syndrome and 11% with Patau syndrome had at least moderate severity hearing loss. Mixed hearing loss predominated, followed by pure conductive hearing loss and sensorineural hearing loss. Further analysis of factors that influence severity and progression will be discussed. These include anomalies such as congenital defects, seizures, presence of cholesteatoma, placement of ear tubes, rate of ear infection, and other relevant conditions. The incidence and impact of ear surgery on hearing progression will also be discussed. **Conclusions:** It is evident that children with either trisomy have hearing loss at rates exceeding the normal population. The specific characteristics that put patients at a higher risk of progression and increased severity of hearing loss are significant. Determination of these factors and interventions that modify their effect provides great value in personalizing care of a population at risk for poor otologic outcomes.

165. Otologic Outcomes in Children with Cleft Lip and Palate and Effects of Surgical Repair

Charmee H. Mehta, BSPH, Charleston, SC; Alexandra O. Hamberis, BS, Charleston, SC; Forest W. Weir, MD, Cincinnati, OH; James R. Dornhoffer, MD, Charleston, SC; Yuan F. Liu, MD, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effects of surgical repair and timing of surgical repair on hearing loss and otologic outcomes in children with cleft lip and/or palate.

Objectives: To assess patterns of hearing impairment in children with cleft lip (CL), cleft palate (CP), or both (CLP); and to determine the effect of surgical repair and timing of repair on otologic outcomes. **Study Design:** Retrospective review. **Methods:** Demographic, otologic, and surgical data for children with cleft lip and/or palate was extracted from the Audiological and Genetic Database (AudGenDB) and analyzed. **Results:** Of the 175,000 children in the AudGenDB, otologic data was available for 42 children with CL, 1007 with CP, and 1137 with CLP. Of these children, 82.1% of children had hearing loss with 18% being of at least moderate severity. The pattern of hearing loss for CL, CP, and CLP subgroups was respectively, 29%, 41%, 48% conductive; 24%, 26%, 21% mixed; and 10%, 3%, 3% sensorineural. Preliminary analysis of surgical data shows that placement of tympanostomy tubes correlated positively with increases in pure tone average, with a 1.4 dB increase per instance of tube placement ($p<0.05$). Analyses of the effect of cleft repair and timing of repair on long term otologic outcomes will be discussed. **Conclusions:** Our study showed a strong prevalence of hearing loss, with an expected predisposition for conductive loss, in children with CP and CLP. In addition, our large sample size allows us to analyze the incidence, timing, and long term effect of surgical management, with results demonstrating that tube placement correlates with additional hearing loss. Analyses of the effect of cleft repair and timing of repair on long term otologic outcomes will be discussed.

166. Temporal Bone Abscess 11 Years after Translabyrinthine Surgery

Jessa E. Miller, BS, Ann Arbor, MI; Emily Marchiano, MD, Ann Arbor, MI; Steven A. Telian, MD, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding of the complications associated with translabyrinthine craniotomy and explain possible risk factors for development of these complications.

Objectives: Late infectious complications after translabyrinthine craniotomy are extremely rare, in large part because the mastoid cavity is effectively isolated from the middle ear space via an autologous fat graft. In this study, we present a case in which an immunocompromised patient may have re-aerated the mastoid defect, allowing for spread of infection from the middle ear in the setting of acute otitis media. **Study Design:** This study describes a case report and literature review on complications following translabyrinthine craniotomy. **Methods:** A 59 year old female with a history of translabyrinthine craniotomy presented with swelling and tenderness involving the postauricular incision site. At the time of presentation, she was taking a small molecule tyrosine kinase inhibitor for chronic lymphocytic leukemia. A review of the literature on infectious complications following translabyrinthine craniotomy was conducted. **Results:** The patient in this report developed a mastoid abscess 11 years after translabyrinthine craniotomy. Mastoid abscesses most commonly develop in the setting of acute otomastoiditis, the presumed mechanism in this case. Although autologous fat grafts are commonly used to eliminate dead space and reinforce dural closure during skull base reconstruction, they are associated with complications from fat necrosis in 1% of cases. This patient's fat graft most likely gradually atrophied after surgery, resulting in aeration of the defect communicating to the middle ear. **Conclusions:** Fat grafts transiently eliminate dead space following translabyrinthine craniotomy, effectively sealing the intracranial compartment, but atrophy may allow for aeration of the cavity and spread of infection from the middle ear in susceptible patients.

167. Sonic Attack on Diplomats in Cuba--A Possible Migraine Etiology

Omid Moshtaghi, MD, San Diego, CA; Jack Birkenbeuel, BS, Irvine, CA; Autefeh Sajjadi, BS, Irvine, CA; Marlon Maducdoc, MD, Irvine, CA; Harrison W. Lin, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should consider that significant sound stimuli can possibly trigger migraine symptoms.

Objectives: To described symptoms reported by Cuban diplomats and propose a possible migraine etiology. **Study Design:** Retrospective review. **Methods:** A review of published accounts describing the history, examination, and testing of the U.S. diplomats in Cuba was performed. **Results:** In total, 21 of the 25 diplomats affected received comprehensive evaluation. Of the cohort, 18 (86%) recall hearing an unknown localized sound prior to symptoms. After which, headaches occurred in 17 (81%) with 16 patients reporting headaches beyond 3 months. Headache associated with photophobia and photophobia was described in 9 (43%) and 6 (29%) of individuals, respectively. Symptoms of dizziness, nausea and general disequilibrium were reported in 13 (62%), 7 (33%), and 14 (67%) of the diplomats, respectively. Cochlear symptoms including hyperacusis, hearing loss, tinnitus, and ear pressure were reported in 14 (67%), 9 (43%), 12 (57%), and 8, (38%) respectively. Sleep disturbance was reported in 18 (86%). **Conclusions:** The high prevalence of new onset headaches, fluctuating symptoms, and dizziness seem likely consistent with vestibular migraine. The cochlear symptoms experienced by the patients appear similar to the recently described cochlear migraine. Furthermore, the fluctuating nature of cognitive symptoms associated with a particular trigger could possibly represent the episodic nature of a migraine. Lastly, the high prevalence of insomnia in this population likely is a source of continuation of symptoms given the relationship between sleep and migraine symptoms.

168. The Size of Internal Auditory Canal Diverticula Is Unrelated to Degree of Hearing Loss

Thomas J. Muelleman, MD, Los Angeles, CA; Kaley J. Pippin, MD, Kansas City, KS; Alicia M. Quesnel, MD, Boston, MA; James A. Lin, MD, Kansas City, KS; Luke N. Ledbetter, MD, Kansas City, KS; Hinrich S. Staecker, MD PhD, Kansas City, KS

Educational Objective: At the conclusion of this presentation, the participants should be able to identify IAC diverticula on imaging, understand the location of IAC diverticula, understand the relationship of hearing loss and IAC diverticula.

Objectives: To explore the relationship between hearing loss and internal auditory canal (IAC) diverticula. To determine whether diverticula exist within or medial to the otic capsule. To determine the prevalence of IAC diverticula in a control population. **Study Design:** Retrospective review. **Methods:** Chart review to identify type and degree of hearing loss. We measured width, length, height, and volume of diverticulum. We measured Hounsfield unit measurements lateral and medial to the diverticulum. **Results:** Pure tone average, air bone gap, and word recognition scores were each found to not correlate with length, width, height, and volume of the diverticula (2 tailed significance for Spearman's rho was >0.05 in all cases). Mean Hounsfield units lateral to the diverticulum (2104 HU, SD 176; range 1720-2460) was found to be significantly higher than the mean Hounsfield units medial to the diverticulum (1818 HU, SD 120; range 1566-2010); Wilcoxon signed rank analysis ($p<.001$). There is a 5.6% prevalence of IAC diverticula in patients who underwent high resolution CT scans for chronic sinusitis (control group). **Conclusions:** The size of IAC diverticula does not correlate with degree

of hearing loss. IAC diverticula may exist medial to, rather than within, the otic capsule given the significant difference in mean Hounsfield units medial and lateral to the diverticula.

169. Migraine Symptoms and Weather: An Investigation of Climate Triggers Using Internet Search Activity

Stephen J. Romeo, DO, Stratford, NJ; Aykut Unsal, DO, Augusta, GA; Claudine Jurkovitz, MD MPH, Newark, DE; Zugui Zhang, PhD, Newark, DE; Michael Teixido, MD, Wilmington, DE

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how weather variables such as atmospheric pressure, wind speed and total precipitation correlate to increased internet search activity for migraine related terms, thus demonstrating weather fluctuations as potential migraine precipitating factors.

Objectives: Variations in weather patterns have been cited as potential migraine precipitating factors, although studies examining specific climate factors are lacking. As society is increasingly utilizing the Internet to learn more about their medical conditions, we explore whether internet search activity (ISA) for migraine related terms can be used to identify specific climate related triggers. **Study Design:** Retrospective population based analysis. **Methods:** Weekly ISA for various migraine related search terms (aura , dizziness , headaches , migraines , nausea , neck pain , vertigo , and visual impairment) during 2012-2015 were extracted from Google Trends across eight large population regions in the US: New York City, New York; Chicago, Illinois; Los Angeles, California; Houston, Texas; Atlanta, Georgia; Seattle, Washington; Oklahoma City, Oklahoma; and Wilmington, Delaware. Data were compared to local average weekly climate data from the National Centers for Environmental Information for the same time periods. **Results:** Atmospheric pressure and average wind speed demonstrated consistent positive correlation to searches for headache, nausea, dizziness, vertigo, and visual impairment ($p<.05$). Additionally, total precipitation showed negative correlation to searches for headache, neck pain, dizziness, vertigo, and visual impairment ($p <.05$). Average temperature demonstrated positive correlation patterns for headaches and vertigo, while dew point temperature correlated negatively with headaches and nausea ($p<.05$, respectively). Thunderstorm activity only correlated positively with searches for vertigo ($p<.05$). **Conclusions:** ISA for migraine related terms correlate strongly with various climate variables reviewed. Atmospheric pressure, wind speed, and total precipitation correlated with several migraine related search terms, suggesting that these climate parameters may be most influential in precipitating migraine related symptoms.

170. Combined Transmastoid and Transcanal Approach to Cochlear Implantation in CHARGE Syndrome

Janine M. Rotsides, MD, New York, NY; Baishakhi Choudhury, MD, New York, NY; J. Thomas Roland Jr., MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss common temporal bone anomalies found in CHARGE patients, as well as describe an alternative approach to cochlear implantation in this population of patients.

Objectives: CHARGE syndrome is associated with a variety of temporal bone and ear anomalies including semicircular canal hypoplasia, cochlear and vestibular nerve hypoplasia, ossicular malformation, aberrant facial nerve course, and even venous anomalies within the temporal bone. These patients often have severe to profound hearing loss necessitating early intervention hearing rehabilitation. The abnormal anatomy and lack of surgical landmarks make cochlear implantation in this population challenging. **Study Design:** Case report and literature review. **Methods:** A pediatric patient with CHARGE presented to our institution for possible cochlear implantation. Preoperative workup including audiologic evaluation and radiographic imaging are reviewed. Intraoperative findings and an alternative surgical approach are described. **Results:** A pediatric patient with CHARGE syndrome and bilateral profound sensorineural hearing loss underwent left cochlear implantation. Multiple anomalies were encountered intraoperatively including a venous anomaly within the mastoid, absent lateral semicircular canal, and aberrant and dehiscent facial nerve. A combined transmastoid and transcanal approach, with a canal wall slit, was taken with safe cochlear implantation. **Conclusions:** CHARGE syndrome is associated with several outer, middle and inner ear anomalies which can make cochlear implantation technically challenging. Recognizing abnormal anatomy during surgery is critical to avoiding injury to important structures. Additionally, alternative approaches should be considered. In this study, we describe a combined transmastoid and transcanal, with a canal wall slit, approach to safe cochlear implantation in such a patient.

171. The Association of Age and Race with Calvarial and Zygoma Thickness

Mohamad Z. Saltagi, MD, Indianapolis, IN; Amit Nag, BS, Indianapolis, IN; Cyrus C. Rabbani, MD, Indianapolis, IN; Elizabeth Schueth, BS, Indianapolis, IN; Rick F. Nelson, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to determine if age and race are associated with skull and zygoma thickness.

Objectives: Spontaneous cerebrospinal fluid (sCSF) leak patients are often middle age and obese. Isolated calvarial thinning in sCSF leak patients is independent of obesity. Recently, obstructive sleep apnea has been independently associated with isolated calvarial thinning. The effect of other patient related factors on skull and zygoma thickness have

not been investigated. This study aims to determine if age and race are associated with skull and zygoma thickness. **Study Design:** Retrospective cohort study of patients with a level 1 polysomnogram and high resolution head CT imaging from January 2010 to March 2017. **Methods:** 447 CT scans were analyzed, with 344 white and 103 black patients. These patient groups were matched for age, OSA status, comorbidities, and body mass index (BMI). All CT scans were measured using 3D slicer. **Results:** Increased age was associated with calvarial thickening [CI=0.006 to 0.012 mm per year, P<0.001] and zygoma thinning [CI=-0.010 to -0.002 mm per year, P=0.002]. In well matched cohorts, black patients had thicker calvaria (3.19 (0.70) vs. 2.67 (0.65) mm; difference, -0.52 mm, [95% CI -0.71 to -0.33]; Cohen's <= 0.78) and thicker zygoma (5.54 (0.87) vs. 4.90 (0.86) mm; difference, -0.64 mm, [95% CI -0.89 to -0.39]; Cohen's <= 0.74) than whites. **Conclusions:** Increasing age is associated with calvarial thickening and zygoma thinning. African American patients have approximately 20% thicker calvaria and 13% thicker zygomas. These findings may have implications for sCSF leaks and should be noted when performing skull measurements. Further studies on the effects of age and race on the risk of facial fractures and sCSF leaks are needed.

172. Factors Contributing to Development of Idiopathic CSF Rhinorrhea versus Otorrhea: A Retrospective Review

Taylor B. Teplitzky, MD, Baltimore, MD; Jason M. Thomas, MD, Baltimore, MD; Prashant Raghavan, MBBS, Baltimore, MD; Andrea M. Hebert, MD, Baltimore, MD; David J. Eisenman, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the preferential development of idiopathic CSF rhinorrhea as compared to CSF otorrhea in at risk patient populations.

Objectives: Spontaneous skull base cerebrospinal fluid (CSF) leaks are commonly seen in patients with, or susceptible to, idiopathic intracranial hypertension (IIH), presenting as otorrhea or rhinorrhea. Imaging findings suggestive of IIH are well established, however, why certain patients develop otorrhea and others rhinorrhea is unknown. We hypothesize that there are clinical and imaging characteristics that can distinguish these populations, which may explain the divergent presentations. **Study Design:** Retrospective chart review of patients undergoing surgical management of spontaneous CSF otorrhea and rhinorrhea. **Methods:** Charts were evaluated for clinical characteristics and operative findings. Imaging was reviewed by a neuroradiologist and statistical analysis was performed via logistic regression. **Results:** Of 44 patients, 35 met inclusion criteria, 30 of whom were female (85.7%). 16/21 (76%) of otorrhea patients were female; all 14 rhinorrhea patients were female (100%) (Ç2, p = 0.049). Mean age and BMI did not statistically differ between the groups (age: 61.7 vs. 57.0, p=0.29; BMI: 35.85 vs. 40.0, p=0.16). 12 radiographic characteristics were evaluated. The presence of an empty sella was more common in those with otorrhea (OR 34.77, p = 0.045, 95% CI 1.05-1156.5). No other characteristics showed significant correlation. **Conclusions:** The data demonstrate a larger mean BMI, slightly younger, all female population developing rhinorrhea versus otorrhea. Empty sella is more prevalent in otorrhea patients, but there were no other imaging findings distinguishing the groups. This suggests a more diffuse process resulting in changes along the skull base, with the preferential development of otorrhea versus rhinorrhea not related to anatomic features alone.

173. Preservation of Low Frequency Hearing Following Cochlear Implantation Is Associated with Improved Word Recognition Scores

Danielle R. Trakimas, MSE, Worcester, MA; Nayha Chopra-Tandon, BS, Worcester, MA; Elliott D. Kozin, MD, Boston, MA; Aaron K. Remenschneider, MD MPH, Worcester, MA

Educational Objective: At the conclusion of this presentation, participants should be able to discuss the expected effect of cochlear implantation on residual low frequency hearing and the importance of low frequency hearing for post-implant word recognition. EAS vs electric alone hearing will be discussed, as will soft surgical techniques.

Objectives: Preservation of residual low frequency hearing (LFH) following cochlear implantation (CI) is variable and its impact on word recognition scores (WRS) is poorly characterized. Herein, we compare postoperative WRS between patients with complete (CP) and partial (PP) preservation of LFH. **Study Design:** Retrospective review of prospectively collected data. **Methods:** CI cases at a single institution from 2016-2018 were reviewed. Inclusion criteria consisted of individuals with pre-CI LFH (thresholds <70dB at d500Hz) and implanted with 24mm electrodes (MedEl Flex24) via a round window approach. Postoperative electroacoustic stimulation (EAS) WRS were compared between patients with CP (<=20dB increase in LFH-PTA (250 and 500Hz)) and PP (>20dB increase in LFH-PTA). **Results:** Eight patients (4 male) with progressive hearing loss were identified. Three patients had CP and five had PP of LFH. The mean age at activation and duration of hearing loss prior to CI were comparable (58±23yr vs 68±13yr, p=0.5; 13±7yr vs 26±18yr, p=0.2). Preoperatively, CP and PP groups also had comparable LFH-PTA (13±11dB vs 30±11dB, p=0.1) and WRS (29±6% vs 14±15%, p=0.1). At 3 and 6 month followup, CP patients showed significantly higher WRS scores than PP patients (67±5% vs 20±8%, p<0.0001; 74±23% vs 27±13%, p<0.05). At 12 months, CP (n=2) patients had higher WRS scores that PP patients, although this difference was not statistically significant (64±14% vs 38±31%, p=0.4). **Conclusions:** The degree of LFH preservation influences postoperative EAS WRS. LFH preservation is possible with 24mm electrodes and effective soft surgical techniques should be prioritized to maximize hearing outcomes. Long term patient followup is needed.

174. Timing of Sequential Cochlear Implantation (CI) Influences Performance of Initial CI in Pediatric Patients

Danielle R. Trakimas, MSE, Worcester, MA; Julia Buirkle, BS, Worcester, MA; Elliott D. Kozin, MD, Boston, MA; Aaron K. Remenschneider, MD MPH, Worcester, MA

Educational Objective: At the conclusion of this presentation, participants should be able to discuss the influence of sequential cochlear implantation on initial cochlear implant word discrimination. Differences between simultaneous versus sequential bilateral implantation will also be discussed.

Objectives: Bilateral (BL) CI has been shown to improve sound awareness and language development in prelingually deafened patients. However, the effect of binaural hearing on ipsilateral word recognition remains under-investigated. Herein, we evaluate the effect of sequential CI on initial ear word recognition scores (WRS). **Study Design:** Retrospective review of prospectively collected data. **Methods:** Pediatric patients receiving followup for sequential CI at a single institution from 2000-2018 were reviewed. Inclusion criteria were: 1) BL prelingual deafness; 2) first CI before 5yo; and 3) reporting of BL postoperative WRS. Last available WRS were compared (phonetically balanced kindergarten (PBK) word scores for age <8yr and consonant nucleus consonant (CNC) word scores for age >8yr) between patients who received both CIs 1) <2yr apart (early sequential CI: ESCI) vs; 2) >2yr apart (late sequential CI: LSCI). **Results:** Eleven patients (6 male) were identified, of which 8 had ESCI and 3 had LSCI. ESCI and LSCI groups had comparable ages at and durations of deafness prior to the first CI (1.6±1.0yr vs 1.7±0.6yr, p=0.9; 1.6±1.1yr vs 1.0±0.7yr, p=0.4). Last available postoperative WRS (after sequential CI) for the first CI were significantly higher for the ESCI group (91±7%) in comparison to the LSCI group (80üü±5%) (p<0.05). Additionally, younger age at the time of second CI positively correlated with higher postoperative WRS for the first CI (r=0.7, p<0.05). **Conclusions:** Pediatric patients receiving a second CI at earlier ages show improved performance with the first CI. Rapid bilateral auditory input may positively impact initial CI discrimination function.

175. Frances E. LeJeune Sr., MD Resident Research Award - Southern Section
Neonatal Abstinence Syndrome and Infant Hearing Assessment: A Kids' Inpatient Database (KID) Review

Adam J. Van Horn, MD, Lexington, KY; Liza M. Creel, PhD MPH, Louisville, KY; Alexander S. Hines, BA, Lexington, KY; Matthew L. Bush, MD PhD FACS, Lexington, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate knowledge of the epidemiology of documented discharge diagnoses of abnormal inpatient hearing assessment in infants with neonatal abstinence syndrome. Participants should also be able to describe socioeconomic factors associated with abnormal inpatient hearing assessment.

Objectives: Opioid abuse and neonatal abstinence syndrome (NAS) has become an epidemic. The purpose of this study is to assess documented rates of inpatient failed newborn hearing screening (NBHS) or hearing loss diagnosis (HL) in infants with NAS, and to assess sociodemographic factors associated with abnormal inpatient hearing results. **Study Design:** Retrospective cohort. **Methods:** The 2012 HCUP/KID national database was used to identify infants with failed NBHS/HL during birth hospitalization. Independent variables included diagnoses of NAS/in utero opioid exposure and sociodemographic data. Univariate analyses and multivariate logistic regression were used to test for associations with abnormal hearing assessment. **Results:** In a database of 1,061,862 patients, infants with NAS had a lower odds ratio of documented failed NBHS (OR=0.73, p<0.001) than non-NAS infants, but there was no difference in documented HL diagnosis (p=0.918). Certain sociodemographic factors had higher odds ratios (OR) of abnormal hearing results, including race (p<0.001) (Black, OR=1.45, Hispanic, OR=1.31, Native American, OR=1.25), nonprivate insurance (p<0.001) (Medicaid, OR=1.27, self-pay, OR=1.23), and micropolitan (OR=1.31) or rural (OR=1.30) residence (p<0.001). A lower odds of abnormal hearing results were found in females (OR=0.85, p<0.001) and infants with higher household income (OR=0.90, p<0.001). **Conclusions:** NAS children have a lower rate of inpatient documented failed NBHS but no difference in HL diagnosis. The complex medical care of these infants could complicate NBHS and subsequent followup. Certain sociodemographic factors result in a higher risk of hearing loss and further research is needed to assess hearing loss screening and diagnosis in vulnerable populations such as NAS infants.

176. Cochlear Basal Turn Dehiscence Width in Unrecognized Perilymph Gushers

Varun V. Varadarajan, MD, Gainesville, FL; Orrin L. Dayton, MD, Gainesville, FL; Reordan O. De Jesus, MD, Gainesville, FL; Patrick J. Antonelli, MD, Gainesville, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the association between cochlear basal turn dehiscence and perilymph gushers, demonstrate the ability to identify cochlear basal turn dehiscence, and discuss the techniques for measuring the width of subtle inner ear defects using modern CT viewing software.

Objectives: Perilymphatic gusher (PLG), an uncommon complication of otologic surgery, has been attributed to communication between the cochlea and the internal auditory canal (IAC). Subtle osseous defects may be missed on review of

routine computed tomography (CT). This study aimed to quantify cochlear basal turn dehiscence not seen on axial CT and correlate defect width to intraoperative PLG. **Study Design:** Retrospective review. **Methods:** Setting: tertiary medical center. Subjects: ears that underwent cochlear implantation or stapedotomy with preoperative helical CT that was interpreted as normal. Outcome: an otologist and a radiologist independently and in a blinded fashion measured the greatest width of IAC cochlea dehiscences on CT images in an oblique plane perpendicular to the basal turn. **Results:** Sixty ears were reviewed, including 3 with surgically confirmed PLGs and 12 with apparent dehiscence without a PLG. Mean defect width with PLG was 0.83 mm (range 0.75-0.9 mm) and without PLG was 0.43 mm (range 0.3-0.65 mm, p=0.011). A greater proportion of PLGs occurred in ears with defects (3 of 15) than in ears without (0 of 45, p=0.013). Using a cutoff of 0.75 mm, a greater proportion of PLGs occurred with defect width >= 0.75 mm (3 of 3) than in defects <0.75 mm (0 of 12, p=0.022). **Conclusions:** CT dehiscence between the IAC and cochlear basal turn, particularly with a width > 0.75 mm, should be considered a risk for PLG with stapedotomy or cochlear implantation.

177. Assessing Laterality and Location of External Auditory Exostoses Using Computed Tomography

David J. Weiland, BS, Irvine, CA; Hossein Mahboubi, MD, Irvine, CA; Jack L. Birkenbeuel, BS, Irvine, CA; Dillon C. Cheung, BS, Irvine, CA; Harrison W. Lin, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the difference in exostoses growth in the right versus the left external auditory canal.

Objectives: To develop a method of determining the sagittal cross-sectional surface area of the external auditory canal (EAC) using computed tomography, assess whether growth of exostoses is equal between the right and left EAC, and compare the location of exostoses in the right versus left EAC. **Study Design:** Retrospective chart review. **Methods:** Preoperative computed tomography scans of 20 patients who underwent exostoses removal were reviewed. Sagittal plane images encompassing the tympanic membrane to the bony cartilaginous junction were imported into ImageJ. The cross-sectional surface area was measured at the point of maximum canal obstruction and at the lateral most portion of the bony canal. Maximum percent obstruction of the right and left ear canal was compared using the Wilcoxon signed rank test. The location origin of the exostoses was compared between the right and left ear canal using the Pearson's chi-squared test. **Results:** Mean age at the time of imaging was 47±14 years. All 20 patients were male. The surfing experience varied but most were lifelong surfers. The maximum percent obstruction was significantly higher (p=0.02144) in the right versus the left EAC. There was not a significant difference (p=0.94037) in the location of the exostoses between the right and left ear canal. Exostoses were primarily anterior, posterior, and superiorly located. **Conclusions:** The right EAC may be more severely affected by exostoses than the left in our surfers with symptomatic exostoses. There does not seem to be a significant difference in the location of the exostoses in the right versus the left ear. Further studies are needed.

178. Skull Base Osteomyelitis Complicated by Petrous Internal Carotid Artery Blowout

Rachel E. Weitzman, MS, Boston, MA; Anuraag S. Parikh, MD, Boston, MA; Shekhar K. Gadkaree, MD, Boston, MA; C. Eduardo Corrales, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss a rare and life threatening complication of skull base osteomyelitis, internal carotid artery blowout, and its unique presentation as fulminant epistaxis, as well as consider potential interventions in the hopes of avoiding this complication.

Objectives: Skull base osteomyelitis (SBO) is an invasive infection of the external auditory canal, which spreads to the skull base, with reported complications of cranial nerve palsies, meningitis, intracranial abscess, and dural sinus thrombosis. Internal carotid artery (ICA) blowout is more commonly associated with head and neck cancer and typically presents with oral bleeding or expanding neck hematoma. We present a case of petrous ICA blowout caused by SBO, which is particularly interesting given its etiology, as well as presentation as fulminant epistaxis. **Study Design:** Case report. **Methods:** Case report and literature review. **Results:** A 77 year old woman presented with a two month history of left ear pain. CT and MRI demonstrated findings concerning for SBO, and the patient was started on broad spectrum IV antibiotics and Ciprodex drops via wick. Over the next three months, the patient had two exacerbations of her SBO. She then presented with a sentinel bleed, requiring bilateral packing, followed by fulminant epistaxis from the petrous ICA the next day. After attempted stent coil placement, the vessel was glue embolized, with hemostasis. Followup imaging showed bilateral acute strokes. With poor neurologic prognosis, the patient was terminally extubated two weeks later. **Conclusions:** This is the second reported case of a massive hemorrhage from ICA blowout secondary to SBO, and the first presentation of which as massive epistaxis. Clinicians should be aware that SBO may predispose to ICA blowout and that this condition may present with fulminant epistaxis. Recognition of a possible sentinel bleed and early surgical or endovascular intervention should be strong considerations in management of SBO.

179. Embryonal Rhabdomyosarcoma of the Middle Ear and Mastoid

Candice B. Yip, MD, Newark, NJ; Yu-Lan M. Ying, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical manifestations and radiographic findings of rhabdomyosarcoma of the middle ear and mastoid.

Objectives: Rhabdomyosarcoma is the most common pediatric soft tissue sarcoma. The majority arises from the head and neck region; however, there are few cases reported in the literature originating from the ear. A rare case of a botryoid variant of embryonal rhabdomyosarcoma from the middle ear and mastoid is presented with radiographic and histologic findings. **Study Design:** Case report. **Methods:** Retrospective review of clinical case with literature review. **Results:** Three year old boy presented with persistent left ear swelling and drainage after a recent history of ear trauma. He was treated with multiple outpatient courses of antibiotics and Ciprodex, and presented to our emergency department after no improvement. On exam, he had large postauricular and preauricular swelling and a violaceous mass in the ear canal. Imaging showed opacification of the left mastoid air cells and middle ear with bony erosion and a soft tissue mass involving the left external auditory canal extending inferiorly to the sternocleidomastoid. Patient underwent a left canal wall up tympanomastoidectomy and excision of the canal mass. Pathology was consistent with botryoid variant of embryonal rhabdomyosarcoma. He was then referred for chemotherapy and proton beam therapy as per the intermediate risk protocol. **Conclusions:** Rhabdomyosarcoma, although rarely found in the middle ear and mastoid, may be confused with otitis media and mastoiditis. Clinicians should be aware of this aggressive malignancy in their differentials in pediatric patients with otologic complaints to prevent delay in diagnosis. A multidisciplinary treatment approach is necessary for management of this rare disease.

PEDIATRIC OTOLARYNGOLOGY

180. A Review of Pediatric Laryngeal Tumors and Analysis of the Demographics, Management, and Survival of Pediatric Laryngeal Squamous Cell Carcinoma

Alexandra M. Forsyth, BA, Boston, MA; Philip R. Camilon, MD, Boston, MA; Jessica R. Levi, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the different histologic types of laryngeal tumors in the pediatric population and the survival of patients with laryngeal squamous cell carcinoma in comparison to laryngeal SCC in adults.

Objectives: To examine the types of malignant pediatric laryngeal tumors and review the demographics, management, and survival of pediatric patients with laryngeal squamous cell carcinoma (SCC). **Study Design:** Retrospective analysis of a large population database. **Methods:** Pediatric patients in the Surveillance, Epidemiology, and End Results (SEER) database were included from 1973-2015 based on a diagnosis of malignant laryngeal tumors using the ICD O-3 code: C32.0 glottis, C32.1 supraglottis, C32.2 subglottis, and C32.9 larynx primary site. Patients were included from ages 0-18 years. **Results:** 23 cases of malignant pediatric laryngeal cancer were identified. 14 patients were male and 9 were female (60.9% and 39.1%, respectively). 16 cases were squamous cell carcinomas and 7 were of various histologic types. Pediatric laryngeal SCC tended to be diagnosed in adolescence (mean age 14.8 years, range 0-18, 82.6% of cases were age 12 and above). Management included no treatment (18.8%), radiation only (18.8%), surgery only (6.3%), radiation and chemotherapy combined (18.8%), and surgery with radiation and chemotherapy (12.5%). Finally, the 2 year and 5 year overall and disease specific survivals were 78.6%. **Conclusions:** Pediatric laryngeal cancer is rare. Squamous cell carcinoma is the most common malignant laryngeal histology affecting pediatric patients. Despite the use of multimodality therapies, survival rates for pediatric patients with laryngeal malignancies are reduced. Physicians should include laryngeal cancer in the differential for pediatric patients with hoarseness, dysphagia, and progressive airway obstruction to avoid a late diagnosis.

181. Facelift Incision for Parotidectomy in Pediatric Nontuberculous Mycobacterial Lymphadenitis

Rebecca A. Compton, MD, Boston, MA; Andrew R. Scott, MD, Boston, MA; Mark A. Vecchiotti, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the surgical management of nontuberculous mycobacterial lymphadenitis and compare incisional approaches for periparotid manifestations of this disease.

Objectives: Nontuberculous mycobacterial lymphadenitis (NTML) is a common indication for pediatric parotidectomy. High rates of wound complications are reported after excision for NTML, drawing importance to incision location. Although the facelift incision (FLI) is an accepted approach for parotidectomy in adults, its use in pediatrics has been infrequently described and may offer advantages in this disease. Possible limitations include bulky perifascial lymphadenopathy and anterior locations. The objective of this study is to present representative cases of NTML excised with FLI in order to review the advantages, limitations, and anatomic considerations of this approach to parotidectomy. **Study Design:** Retrospective case series. **Methods:** Six consecutive patients who underwent parotidectomy for NTML are described. Operative notes were surveyed for relevant surgical details. Primary endpoints postoperatively were scarring, wound infection, disease recurrence, and facial nerve palsy. **Results:** The average age at surgery was 23 months. Surgical approaches included three uses of FLI and three uses of a modified Blair incision (MBI). Three cases required dermal curettage and two required skin excision with cervicofacial advancement closure. FLI permitted access for dissection of the anterior parotid, levels 1B through 3, and the facial nerve. There were no recurrences. Wound complications included one suture reaction in the FLI group and two instances of temporary marginal mandibular nerve weakness in the MBI group. Scar widening was observed in all. **Conclusions:** The facelift incision has the advantage of a more hidden scar and may serve

as an alternative approach to parotid surgery in younger children with NTML.

182. Jugular Bulb Height Is Unrelated to Isolated Unilateral Congenital Aural Atresia

Tyler R. Halle, MD, Atlanta, GA; Amanda S. Corey, MD, Atlanta, GA; N. Wendell Todd, MD MPH, Atlanta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the development of the jugular bulb, recognize the complex relationships that exist between the jugular bulb and other temporal bone structures, and appreciate how these can affect surgical approaches to the middle ear.

Objectives: The height of the dome of the jugular bulb is variable and of clinical significance because high riding jugular bulbs may limit the extent of middle ear dissection and increase risks of the procedure. We hypothesized that the height of the osseous jugular bulb is unrelated to the side of aural atresia in children with isolated nonsyndromic unilateral aural atresia. **Study Design:** Retrospective self-controlled case series. **Methods:** We reviewed high resolution computed tomography scans of the temporal bones of 69 children with isolated nonsyndromic unilateral congenital aural atresia. Images were viewed in the transverse (axial) plane after applying a standardized window width and window level. Images were reviewed in concert by a neuroradiologist and a pediatric otologist. The height of the top of the osseous dome of the jugular bulb was measured relative to two points: 1) the superior-most CT slice at which the jugular bulb clearly showed continance with the sigmoid sinus; 2) the inferior-most portion of the basal turn of the cochlea. Paired t-test was used to compare the height of the jugular bulb ipsilateral to the aural atresia to that of the contralateral clinically normal ear. **Results:** The height of the jugular bulb as measured relative to its confluence with the sigmoid sinus or to the basal turn of the cochlea was not related to the side of aural atresia (P=.45 and P=.39, respectively). **Conclusions:** The height of the jugular bulb is not related to the side of aural atresia.

183. Population Based Survival Analysis of Pediatric Tonsillar Malignancies and Review of a Rare Case

Tyler A. Janz, BS, Orlando, FL; Ramamoorthy Nagasubramanian, MD, Orlando, FL; Julie L. Wei, MD, Orlando, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the histological types of tonsillar malignancies as well as understand the common patient demographics and treatment modalities of these patients. Finally, the participants should be able to understand the survival outcomes of pediatric patients with tonsillar malignancies.

Objectives: To examine the different types of pediatric tonsillar cancers and review the demographics, management, and survival of these patients. **Study Design:** National population based retrospective review using the Surveillance, Epidemiology, and End Results (SEER) database. **Methods:** Pediatric patients in the SEER database were included from 1973-2014 based on a diagnosis of tonsillar malignancy using the ICD O-3 tonsil primary site codes of: C09.0, C09.1, C09.8, and C09.9. Patients were included from ages 0-18 years. Additionally, we present a case of pediatric natural killer (NK) cell tonsillar lymphoma diagnosed and treated at our hospital. **Results:** One hundred forty-one cases of tonsil cancer were identified. The mean age at diagnosis was 9.9 years (SD: 5.1, range: 0.0-18.0). Ninety five (67.4%) patients were male and 116 (82.3%) had unilateral malignancies. Burkitt lymphoma (32.6%) followed by diffuse large B cell lymphoma (DLBCL) (27.0%) were the two most common histological types of tonsillar cancers. 79.4% of patients received chemotherapy and 81.6% received surgery as a part of their care. The 5 year disease specific survival rate was >90% for patient cohorts diagnosed from 1984-1993, 1994-2003, and 2004-2014 as compared to 64% for patients diagnosed from 1973-1983 (p=.01). **Conclusions:** Pediatric primary tonsil cancer occurred most commonly in adolescent males and usually presents as a unilateral mass. Lymphoma remains the predominant histological type of cancer. Most patients are likely to receive surgery and chemotherapy. Survival rates for pediatric patients with tonsillar cancer are excellent.

184. Prevalence of Prescription Medication Use in Preschool Aged Children Seen in Pediatric Otolaryngology

Friederike S. Luetzenberg, BS, Orlando, FL; Timothy M. Maul, PhD, Orlando, FL; Julie L. Wei, MD, Orlando, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to critically discuss the medication prevalence of pediatric patients presenting to otolaryngology clinics.

Objectives: To examine the prevalence of daily medication use and prescribing patterns in preschool aged children presenting to otolaryngology clinics. **Study Design:** Retrospective summary of prescription related data from PEDSnet database of two tertiary care children's hospitals. **Methods:** All new patients between birth and 5 years of age seen at otolaryngology clinics from October 1, 2016 through September 30, 2017 were included. Existing diagnoses, active prescriptions at time of visit, prescription dates, and demographics were abstracted. Summary analysis was performed on medication prevalence, quantity and duration of use, comparing all variables between age, gender, and geographical regions. **Results:** Of 7,532 patient encounters, 20% presented with active daily medication use. Eustachian tube dysfunction and otitis media were the most common diagnoses regardless of daily medication usage. Corticosteroids, specifically hydrocortisone (northeast) and Flovent (southeast), were the most common medications prescribed. The number of medi-

cations strongly correlated with the number of encounter diagnoses. Overall, patients in the northeast were 4.5 times more likely to have at least one prescription prior to encounter ($p<0.05$, 95% CI 3.2-4.8). This pattern was preserved across age and gender. Patients with medication in the northeast and southeast had a median of 2 (IQR 3.0-1.0) and 1 prescriptions (IQR 2.0-1.0), respectively ($p<0.001$). There were no differences based on insurance type and no correlations between medication count and age or gender. **Conclusions:** Children in the northeast presented to otolaryngology clinics with significantly more prescribed medications than in the southeast. Regional differences were consistent across age and gender. Most children were on these medications for a significant duration.

185. Diagnosis of Otitis Media with Effusion with Optical Tympanometry

Hossein Mahboubi, MD MPH, Irvine, CA; Autefeh Sajjadi, MD, Irvine, CA; David T. Chang, MD, Irvine, CA; Nguyen S. Pham, MD, Irvine, CA; Elliot Botvinick, PhD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand difficulties of establishing a correct diagnosis of otitis media with effusion in the pediatric population and describe how optical tympanometry may be able to assist physicians with diagnosing this condition.

Objectives: To evaluate a novel optical tympanometer device in the diagnosis of otitis media with effusion in the pediatric population and to determine its sensitivity and specificity for an accurate diagnosis. **Study Design:** A prospective cohort study. **Methods:** There were 30 participants aged 13 years or younger (28 of which were 7 years or younger) including 18 males and 12 females. All subjects were planned to undergo myringotomy with pressure equalizing tube placement. The device uses spectral bands overlapping commercially available LEDs to obtain reflectance measurements of the ears after canal cleaning. The device does not require a seal of the ear canal, and testing can be performed in a few seconds. The measurements were analyzed by the device software algorithm for prediction of presence of middle ear effusion. Sensitivity and specificity for fluid detection were calculated. **Results:** A total of 49 ears underwent myringotomies of which 25 had effusion. The optical tympanometer predicted presence of fluid in all but one ear. In those without fluid, the device predicted no fluid in all except for one ear. As such, the sensitivity and specificity of the optical tympanometer were 96.0% and 96.0%, respectively. **Conclusions:** Optical tympanometry is a novel technique that can assist physicians with diagnosing otitis media with effusion, especially in the pediatric population where narrow and small external auditory canals can make a correct diagnosis difficult.

186. Ear Mass in Pediatric Patient with Leukocytosis: A Case Report and Review of the Literature

Weston L. Niermeyer, BS, Columbus, OH; Scott R. Smith, BA, Columbus, OH; Patrick C. Walz, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss a differential for a unilateral ear mass presenting with leukocytosis by reviewing a unique case as well as previous reports in the literature.

Objectives: To contribute to the literature an atypical presentation of combined parvovirus and Epstein-Barr virus presenting as a middle ear mass in conjunction with severe leukocytosis initially concerning for malignancy. **Study Design:** Case report and literature review. **Methods:** We report a case of a pediatric patient found to have a unilateral ear mass and leukocytosis at the time of tympanostomy tube placement. **Results:** A 15 month old female presented with history of recurrent acute otitis, a current infection and symptoms of otalgia, fever and significant malaise. Tympanostomy tube placement was indicated. The middle ear space was filled with granulomatous tissue. Specimen was sent to pathology and the patient was found to have an elevated white cell count of 81,600 and lactate dehydrogenase of 1855. Findings were concerning for hematogenous malignancy versus atypical reactive phase of a viral etiology. Viral titers returned positive for parvovirus B19 and Epstein-Barr virus (EBV) and the decision was made to defer additional invasive testing. The patient was treated with ciprofloxacin dexamethasone ototopical drops. Leukocytosis downtrended and the patient improved clinically. A 2 week followup revealed resolution of the middle ear opacification and laboratory abnormalities. EBV associated granulation tissue and EBV induced lymphomas in the middle ear have been reported, but this is the first reported case of coinfection with laboratory findings suspicious for malignancy. **Conclusions:** The patient's middle ear mass and leukocytosis were ultimately attributed to a coinfectious process with parvovirus and EBV. This case illustrates an important consideration in the differential of a patient with findings otherwise concerning for malignancy.

187. Drivers of Prolonged Length of Stay in Children with Parotitis

Nirali M. Patel, BA, Newark, NJ; Aparna Govindan, BA, Newark, NJ; Lea C. George, BS, Newark, NJ; Amy P. Bansal, MD, Newark, NJ; Evelyne Kalyoussef, MD FACS, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to identify patient characteristics associated with prolonged length of stay (LOS) in pediatric admissions for parotitis.

Objectives: To identify patient characteristics associated with prolonged length of stay (LOS) in pediatric admissions for parotitis. **Study Design:** Retrospective cohort study. **Methods:** The Kids' Inpatient Database was queried for pediatric admissions for parotitis from 2000 to 2012. Univariate analysis and multivariate logistic regression analysis was performed

to identify demographic and comorbid variables leading to increased incidence of prolonged LOS, defined as >75th percentile. **Results:** A total of 2,961 patients met our inclusion criteria. The 75th percentile for length of stay was defined as 3 days. Patients of age < 1 year showed increased odds of prolonged length of stay (odds ratio [OR] = 3.566, p < 0.001). On univariate analysis, Black race ([OR] = 1.856, p < 0.001) and Hispanic race ([OR] = 1.332, p = 0.010) were predictive of prolonged LOS. Deficiency anemias were correlated to prolonged LOS ([OR] = 3.856, p < 0.001). On multivariate regression analysis, age < 1 year ([OR] = 3.406, p < 0.001), Black race ([OR] = 1.478, p = 0.015), and deficiency anemias ([OR] = 2.353, p = 0.003) were found to be independently predictive of increased length of stay. **Conclusions:** Despite vaccination efforts, parotitis remains a common pediatric illness leading to significant morbidity. In this study, we found that patient demographic factors and comorbid conditions may be predictive of increased LOS. Identification of patient risk factors associated with prolonged LOS may aid in optimization of patient management and reduction in hospital costs.

188. Regional Influences on the Management of Pediatric Deep Neck Abscesses

Nirali M. Patel, BA, Newark, NJ; Aparna Govindan, BA, Newark, NJ; Lea C. George, BS, Newark, NJ; Sana H. Siddiqui, BA, Newark, NJ; Amy P. Bansal, MD, Newark, NJ; Evelyne Kalyoussef, MD FACS, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to identify regional variations in management of pediatric deep neck abscesses.

Objectives: To identify regional variations in management of pediatric deep neck abscesses. **Study Design:** Retrospective cohort study. **Methods:** The Kids' Inpatient Database was queried for pediatric admissions for deep neck abscesses from 2000 to 2012. Regions were defined by the U.S. Census Bureau. Chi-square analysis was used to determine variations by region. **Results:** A total of 27,091 patients met our inclusion criteria. Of those, 14,793 (54.6%) patients were medically managed and the remaining patients (45.5%) underwent surgical management. The south (p < 0.001) and west (p < 0.001) had significantly more patients that were medically managed, as were patients treated at rural hospitals in the midwest (odds ratio [OR] = 1.662, p < 0.001) , south ([OR] = 1.469, p < 0.001) and west ([OR] = 1.811, p < 0.001). When comparing comorbidities, deficiency anemias (p = 0.003), fluid and electrolyte disorders (p = 0.006) and obesity (p = 0.023) were significantly increased in the south, as was chronic pulmonary disease (p < 0.0001) in the northeast. There was a significant difference in length of stay between regions (p < 0.001), potentially due to differences in management. **Conclusions:** Deep neck abscesses are common pediatric illnesses, leading to significant morbidity. Our study found that patients in the south and west were significantly more likely to be managed medically as were patients treated at rural hospitals in the midwest, south and west. Further studies should target the factors influencing management in different regions in order to optimize patient outcomes.

189. Improving Interspecialty Communication in the Treatment of Pediatric Craniofacial and Skull Base Tumors Using Personalized 3D Printed Models

Sanjay P. Prabhu, MBBS, Boston, MA; Natasha D. Dombrowski, BA, Boston, MA (Presenter); Salim Afshar, DMD MD, Boston, MA; Carolyn R. Rogers-Vizena, MD, Boston, MA; Peter Weinstock, MD PhD, Boston, MA; Reza Rahbar, DMD MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the utility of 3D models in interspecialty surgical planning for the treatment of pediatric head and neck tumors.

Objectives: We assessed utility of 3D printed models for presurgical planning and patient/family education in complex pediatric head and neck tumors. **Study Design:** Retrospective review. **Methods:** In this IRB approved study, an in-house printing team created 3D printed models for surgical planning from cross-sectional studies in 20 pediatric patients with head and neck tumors between June 2013 and June 2018. **Results:** Presurgical models were created in 20 patients (14 males) (ages 9 months-19 years) with a range of head and neck tumors including ameloblastoma (n=2), fibrous dysplasia (n=2), frontal sinus osteoma (n=2), neuroectodermal tumor of infancy (n=2), desmoid (n=2), palatal dermatofibrosarcoma (n=1), maxillary myxoma (n=1), facial rhabdomyosarcoma (n=1), juvenile nasopharyngeal angiofibroma (n=1), clival chordoma (n=1), skull base aneurysmal bone cyst (n=1), osteochondroma (n=1), mesenchymal chondrosarcoma (n=1), osteosarcoma (n=1), and sinonasal esthesioneuroblastoma (n=1). Models clarified tumor relationship to key anatomic structures and were a focal point for preoperative multidisciplinary discussion, clarifying treatment goals and surgical plan. Additionally, models were used to facilitate discussion of tumor location and plan with patients and their families. Models were used in 6 cases for presurgical planning, in 1 case for patient education, 1 for team communication, and 8 for a combination of the 3 purposes. Two to three subspecialty surgeons participated in surgical planning, tumor resection and reconstruction. **Conclusions:** Patient specific 3D models can help surgical planning, enhance communication between surgeons involved in complex head and neck tumor resections, and facilitate intersurgeon and surgeon patient communication by providing a clear visual centerpiece that eliminates ambiguity about anatomy and surgical plan.

190. Revision Surgery Rates among Children Receiving Percutaneous Bone Conduction Implants

Patricia L. Purcell, MD MPH, Toronto, ON Canada; Karen A. Gordon, PhD CCC-A, Toronto, ON Canada; Blake C. Papsin, MD MSc, Toronto, ON Canada; Sharon L. Cushing, MD MSc, Toronto, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the unique challenges associated with placement of percutaneous osseointegrated bone conduction implants in pediatric patients.

Objectives: Percutaneous bone conduction implants (PBCIs) require maintenance of the external abutment to minimize complications. There is evidence to suggest that maintenance may be more difficult in pediatric patients. This study explores the frequency of complications among children who underwent PBCI placement. **Study Design:** Retrospective case series. **Methods:** Surgical record review identified all patients who had undergone PBCI placement between 1998 and 2018 at a pediatric tertiary care center. Student t-test was used to compare mean age at time of surgery of patients who required revision surgery to those who did not. **Results:** 155 patients underwent PBCI placement. The indications for surgery included the following: conductive hearing loss associated with bilateral atresia (67%), trisomy 21 (13%), and other etiology (12%), as well as single sided deafness (8%). Overall, mean/median age at time of initial procedure was 6.9 years (SD=4.3)/6.2 years (range 1.2-17.8 years). Mean duration of followup was 65 months (SD=47). Eighty-two of 155 children (53%) required a return to the operating room for revision procedure, and 35 (22.6%) required multiple operative revisions. There was a significant difference in mean age at time of initial surgery between children who required multiple operative revisions (5 years, SD=3.2) and those who did not require any secondary procedures (8.8 years, SD=4.7), p-value <0.001. **Conclusions:** Despite their potential benefit, PBCIs are associated with potentially high rates of complications in pediatric patients. Families need to be counseled accordingly. Such findings demonstrate the need for bone conduction solutions that provide high fidelity sound with less morbidity.

191. Shirley Baron Resident Research Award - Western Section

The Validation of Laryngomalacia Classification Systems: A Multi-Institutional Agreement Study

Shanmugappiriya Ummaiyal Sivarajah, MD, Edmonton, AB Canada; Andre Isaac, MD MSc FRCSC, Edmonton, AB Canada; Deepak Mehta, MD, Houston, TX; Paul Hong, MD FRCSC, Halifax, NS Canada; Yaser Alrajhi, MD FRCSC, Edmonton, AB Canada; Hamdy El-Hakim, MB ChB FRCS, Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, participants should be able to explain the challenges in using current classification schemes for diagnosing laryngomalacia and determining its true epidemiology.

Objectives: Congenital laryngomalacia (LM) is frequently described as the most common cause of stridor in infants. Although there are several proposed morphological classification systems for LM, the literature supporting the validity of these systems are currently lacking. The objective of our study is to determine the agreement of expert otolaryngologists on LM diagnosis using the Holinger and Olney diagnostic classification systems. **Study Design:** This is an inter and intrarater agreement study between three expert observers. Infants and children under the age of 17 (mean age=32.9 months) who had an endoscopic diagnosis of LM by an experienced observer at a tertiary care center were included in the study. **Methods:** We recruited three expert pediatric otolaryngologists to interpret 93 de-identified endoscopic videos using both the Holinger and Olney classifications. Patients with congenital syndromes, a history of Pierre Robin sequence, neurological impairment, hypotonia, airway surgery prior to first endoscopic examination, an anterior larynx or any associated secondary airway lesions were excluded. Unweighted Cohen's kappa coefficients were calculated for each measure of interrater validity. **Results:** The kappa coefficients with 95% confidence intervals amongst the raters using the Holinger classification were 0.23 [0.13-0.32], 0.36 [0.24-0.49], and 0.25 [0.15-0.46], indicating poor interrater reliability. Similar results were obtained for the Olney classification, with kappa coefficients of 0.33 [0.21-0.46], 0.22 [0.07-0.37], and 0.34 [0.17-0.49]. **Conclusions:** Our study indicates poor interrater reliability with the Holinger and Olney classification systems amongst expert observers. This has significant implications for the accurate diagnosis of children with LM, creating a hurdle towards credible work on quality population studies.

192. Impact of Multidisciplinary Rounds within a Pediatric Otolaryngology Unit

Matthew M. Smith, MD, Cincinnati, OH; Douglas C. Von Allmen, MD, Cincinnati, OH; Michelle M. Coleman, MSN, Cincinnati, OH; Anna Sheets, DNP, Cincinnati, OH; Emily E. Donoghue, BSN, Cincinnati, OH; Alessandro de Alarcon, MD MPH, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the benefits to multidisciplinary rounds, understand the importance and impact multidisciplinary rounds has on the patient/family experience, and explain to others how multidisciplinary rounds increases communication between providers, patients and their families.

Objectives: Describe the benefits of multidisciplinary rounds in a pediatric otolaryngology unit and describe how communication increases during multidisciplinary rounds between providers, patients and their families. **Study Design:** Prospective plan-do-study-act quality improvement initiative. **Methods:** A standardized rounding process using a plan-do-study-act (PDSA) model was implemented within a pediatric otolaryngology unit. The primary goal was to improve the

participation and communication of different populations (residents/fellows, nurses, families) during rounds. PDSA cycles included: 1) set expectations for who is involved in rounds and when; 2) provide notification of rounds prior to arrival on unit; and 3) implementation of standardized content discussed on rounds. We evaluated the participation of each population before and after implementation of each PDSA cycle. This occurred from November 2017 to May 2018. Errors were defined as a deviation from the standardized rounds model. **Results:** Prior to implementation of standardized rounds, median participation of all populations together on rounds was 17%, which improved to 78% after all PDSA cycles. There was no change in the median length of rounds per patient during the study period (3.75 minutes). Physician and family engagement scores increased following initiation of the study, particularly the question did physicians explain things to the patient which increased from 67% to 80.6%. **Conclusions:** Overall participation in multidisciplinary rounds drastically improved from 17% to 78% following implementation of a standardized rounding process. Communication between physicians and patients increased by 13% due to multidisciplinary rounds.

Posters

Active Fellows

Mona M. Abaza, MD
Elliot Abemayor, MD PhD FACS
Oliver F. Adunka, MD
Yuri Agrawal, MD
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